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BIOPHYSICAL RESOURCES
OF THE
EAST KOOTENAY AREA: SOILS

Report No. 20

British Columbia Soil Survey

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ABSTRACT

This report and accompanying soil maps describe the soils that occur in the East Kootenay region of British Columbia. One hundred and thirty-eight biophysical soil associations were identified. These have been field checked, mapped, sampled, analyzed for physical and chemical properties, and classified according to the Canadian System of Soil Classification. They have been evaluated for a variety of land use interpretations.

The soil mapping is reconnaissance in nature. It was compiled at 1:50 000 scale and is presented at 1:100 000 scale on the enclosed maps. The report and map are mainly intended for resource planning and management at a regional level. Mapping is based upon air photo interpretation, supplemented by two field seasons of field traverses to verify, or refine, preliminary boundary locations, as well as to determine and record specific soil information.

PREFACE

This report is one in a series that describe and analyze the biophysical resources of the East Kootenay region. Individual reports (with maps) focus on the terrain (surficial geology), soils, climate, vegetation, wildlife, aquatics, and outdoor recreation resources.

The study of the East Kootenay region was initiated in response to increasing pressure on biophysical resources and the development of land use conflicts. Forestry, mining, ranching, farming and tourism are all major contributors to the economic well-being of the region. General population growth and maintenance of these industries require that land be allocated for urban and industrial expansion and transportation corridors, and yet at the same time, areas be preserved for wildlife and recreational purposes.

The data, analyses, and interpretations that are contained in the various reports and maps will assist in the development and implementation of rational resource management policies for the area. In addition, information presented in these publications provides a basic understanding of the physical and biological components of regional land and water systems.

It is anticipated that careful utilization of these data bases will ultimately aid in the maintenance of a high quality environment in this part of British Columbia.

ACKNOWLEDGMENTS

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Field assistance in soil mapping and classification was provided by V. Hignett, M. Fenger, R. Beale-Kuurne and T. Rollerson. Thanks are also extended to the seasonal employees who assisted in field mapping. T.Lea, J. Ryder, D. Demarchi and R. Chilton provided valuable information for correlation with vegetation, terrain, wildlife and climate mapping, respectively. J. Jungen and U. Wittneben provided information and assistance in correlation with soil surveys to the west of the study area.

R. Blaney, M. Botting, and their staff, are acknowledged for preparing the manuscript soil maps. R. Thomas prepared the report graphics. The preparation and publication of the enclosed 1:100 000 scale soil maps (color) by the staff of the Cartography Section, Land Resource Research Institute, Agriculture Canada, Ottawa, is also gratefully acknowledged. Financial assistance for the publication of this report was provided in part by the B.C. Ministry of Forests, Nelson Forest Region.

Appreciation is extended to V. Osborne (ret.), H. Chuah and staff for laboratory analysis and for their technical advice. Acknowledged also are Parks Canada and British Columbia Ministry of Parks for permitting access and sampling in Kootenay National park and Mount Assiniboine Provincial Park, respectively.

HOW TO USE THE SOIL REPORT AND MAPS

The description of the soils, the environment in which they occur, and their suitability, or limitations, for specific uses are presented in the soil report. The soil maps show the areal distribution of the various soils with the specific soils in each map delineation identified by unique symbols. As well, symbols signifying the slope classes of the map delineations, the components of the soil associations, and the relative proportion of each soil association in a map delineation are also given. The legend attached to the side of the soil map identifies the symbols used on the maps and summarizes important soil association characteristics affecting both soil classification and management. The 1:100 000 scale soil maps should be used in combination with this report at all times.

The report consists of five chapters.

Chapter One briefly describes the overall environmental and social characteristics of the East Kootenays.

Chapter Two describes the field work methodology, as well as explaining how the soil associations, soil association components, soil legends and soil maps were derived.

Chapter Three discusses the general characteristics and classification of East Kootenay soils and surficial materials, and describes their regional distribution.

Chapter Four describes in detail the characteristics of the individual soil associations identified and mapped in the East Kootenays.

Chapter Five describes the methodology for interpreting the soils for various land uses, and provides the results of these interpretations.

Users of the soil maps and report should first locate the area of interest on the soil map and determine the symbols in the map delineations. The symbols are defined in the map legend and indicate the topography (slope) of the delineation, the soil associations present, as well as some generalized information regarding soil parent material and forest zones and subzones. For more detailed information, including definition of the soil association components, the user should refer to the soil association descriptions in Chapter Four. For information regarding suitability/limitations/capability of the identified soils for specified purposes, the user is directed to Chapter Five.

Users can also develop their own interpretations using the soil descriptions in Chapter Four and the laboratory analyses available from the B.C. Soil Information System. it must be remembered, however, that the soil maps accompanying this report represent a reconnaissance level of mapping and the information is intended for overview planning and general management decisions. Not all soil map delineations have been field checked, and even in those that were checked, other soil associations than those described in the soil map delineation symbol, may exist. Site specific applications require onsite inspections to determine precisely which soil association component is present at the particular site of interest, and to determine whether inclusions of other soil association (that could not be depicted at the scale of mapping) are present.

For general, or more specific information regarding terrain, vegetation, wildlife, aquatics, recreation, and climate of the East Kootenay area, refer to the appropriate publication in the East Kootenay report series. Detailed soil profile descriptions and laboratory data are not included with this report, but are available upon request from: the B.C. Soil Information System, Waste Management Branch, B.C. Ministry of Environment, Parliament Buildings, Victoria, B.C. V8V 1X5.

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CHAPTER ONE

INTRODUCTION

1.1 GENERAL DESCRIPTION OF THE EAST KOOTENAY AREA

The areas described and evaluated by this report and accompanying soil maps includes the majority of the lands generally referred to as the East Kootenays. The project area boundaries are 116^0 west longitude on the west, the British Columbia - Alberta border to the east and north, and the Canada - Unites States of America border on the south (Figure 1.1).

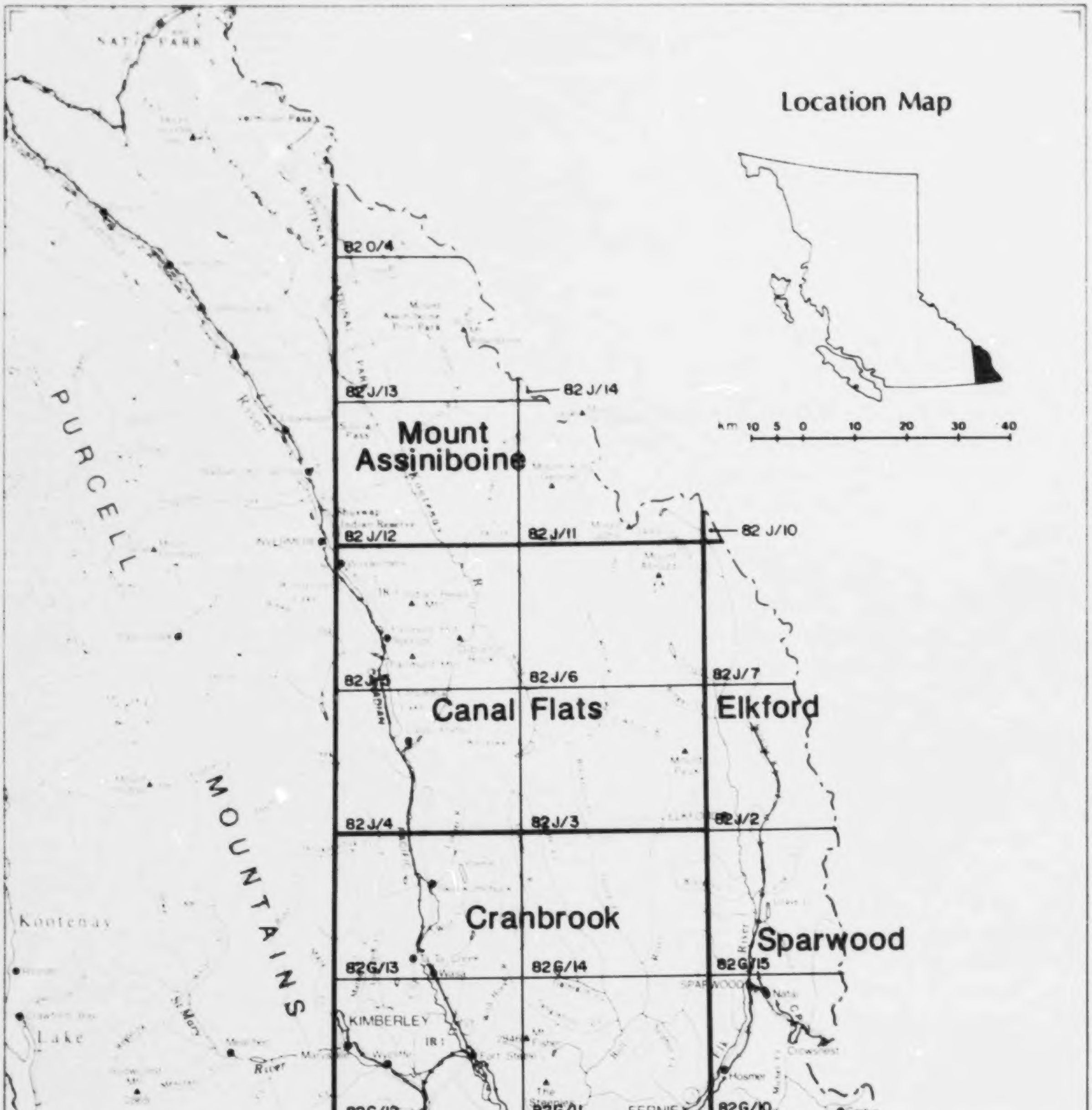
Portions of two major physiographic subdivisions occur in the project area. These are the Columbia Mountain system, represented by the Purcell Mountains on the west, and the Rocky Mountain system, composed of the Kootenay, Park, Front, Galton, MacDonald and Clark ranges, and the Fernie and Flathead basins which lies to the east (Figure 1.2). The Rocky Mountain Trench lies between, and separates, the two mountain systems. In the project area, the Rocky Mountains are characterized by steep walled, rugged, glacially carved, rocky peaks aligned in parallel ridges trending southeast to northwest. Broad valleys occupied by incised, or meandering rivers and streams lie between ridges. The portion of the Purcell Mountains in the project area has relatively more subdued peaks in comparison to those of the Rockies.

Extensive areas in the Rocky Mountains are characterized by limestone and dolomite bedrock (Figure 1.3). Large areas of quartzite and argillite also occur. In the Fernie and Flathead basins, shale, sandstone, conglomerate, coal, mudstone and siltstone outcrop, with calcareous bedrocks being less common. The broad, flat floored upper Kootenay and White river valleys are eroded into extensive areas of phyllite. Bedrocks in the Purcells are varied, but commonly include argillite, quartzite and lesser amounts of limestone.

In an elevational sequence for a typical, broad East Kootenay valley, surficial materials generally consist of gravelly floodplain on the valley floor, with adjacent gravelly fluvial or fluvioglacial terraces and fans at slightly higher levels. Remnants of glaciolacustrine terraces may also be present. Silty morainal (glacial till) materials commonly occur on hills and lower valley slopes. Lower to middle valley slopes are often mantled by blankets of deep, rubbly colluvial materials, while higher on the slopes, colluvial veneers predominate, with rock outcroppings above them. Physiographic subdivisions, types of bedrock and surficial materials are more fully discussed in Ryder, 1981.

Moisture laden air masses from the Pacific Ocean dominate the climate of the East Kootenays. Heavy rains and snowfalls occur on the western slopes of the Purcell Mountain, while the eastern slopes and the Rocky Mountain Trench are in a rainshadow. Precipitation again increases eastward on the western slopes of the Rocky Mountains, up to the Contintental Divide at the British Columbia - Alberta border. Precipitation maxima occur in December or January and June, minima in April and July. Approximately one-third of the total precipitation falls as snow. In the winter, cold, continental air from the north readily enters the area via the southeast to northwest trending valleys. Similarly, in the summer, hot, dry air enters the East Kootenay area from the dry interior plateaus of Idaho and Montana. In valley bottoms, frosts are common in the late spring, early fall and even occasionally in summer, as cold air may intrude into the area in any season. Compared to other semiarid valleys in southern British Columbia, the East Kootenay valleys have shorter freeze-free periods.

The majority of the East Kootenay area falls in the Dry Interior Forest Region, an area characterized by the Interior Rocky Mountain Douglas-fir Forest Zone at lower elevations and the Engelmann spruce - alpine fir Forest Zone at higher elevations (Figure 1.4). Areas of krummholz and alpine vegetation are limited in extent due to the steepness and rockiness of the high elevation mountain peaks.


Location Map
km 10 5 0 10 20 30 40
PURCELL
MOUNTAINS
Mount Assiniboine
Canal Flats
Elkford
Cranbrook
Sparwood
Elko
Flathead
82 O/4
82 J/13
82 J/14
82 J/12
82 J/11
82 J/10
82 J/5
82 J/6
82 J/7
82 J/4
82 J/3
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82G/11
82G/10
82G/5
82G/6
82G/7
82 G/8
82G/4
82G/3
82G/2
82G/1
KIMBERLEY
CRANBROOK
FERNIE
SPARWOOD
CRESTON
Kootenay
Lake
Koocanusa
U.S.A.

Figure 1.1. Location of the East Kootenay area. The boundaries and names of the individual soil maps are also shown.

The southwest portion of the project area includes parts of the Interior Wet Belt Forest Region, with its characteristic western hemlock - western red cedar Forest Zone at lower elevations and Engelmann spruce - alpine fir Forest Zone at higher elevations. Vegetation parameters are more fully discussed in Lea, 1984.

The most common soils in the Rocky Mountain Trench and at lower and middle elevations in the Rocky Mountains are Orthic Eutric Brunisols (Canada Soil Survey Committee, 1978) developed in calcareous parent material (Figure 1.5). Brunisolic Gray Luvisols are also common at the middle elevations where parent materials are somewhat finer textured, while in areas on noncalcarous bedrocks, Orthic Dystric Brunisols are common. At higher elevations, Orthic Humo-Ferric Podzols and Podzolic Gray Luvisols dominate, along with exposed bedrock. In the Purcell Mountains, soils are predominantely Orthic Dystric Brunisols and Brunisolic Gray Luvisols at lower elevations and Orthic Humo-Ferric Podzols in wetter areas at higher elevations. Regional distribution of soil subgroups are more fully discussed in Chapter Three.

Water bodies of major significance are found only in the Rocky Mountain Trench and include Windermere Lake, Columbia Lake and Lake Koocanusa. The latter is part of the man-made reservoir behind the Libby Dam located in Montana (Figure 1.1). Major river systems include the south flowing Kootenay River, its major tributary, the Elk River, the headwaters of the Flathead River, the Moyie River and the northwest flowing headwaters of the Columbia River.

Settlement in the East Kootenays is primarily centered in the Rocky Mountain Trench and the Elk River valley. Cranbrook is the main service centre for the area while the nearby cities of Kimberley and Fernie primarily serve mining interests. In the northern part of the area, settlement is less dense and characterized by small towns such as Canal Flats which serves the forest industry, and Windermere, a popular recreation centre.

Agriculture in the East Kootenays is largely centered around the ranching industry. Forages are the main commercial crops grown. A small, commercial mixed vegetable farm exists near Cranbrook and limited portions of Saint Mary's Prairie area are, or have been, dry farmed for cereal crops. In addition, limited areas are utilized for pasturing dairy cattle. Nearly all of the agricultural lands are located in the Rocky Mountain Trench, or in the Elk River Valley downstream from Elkford. Except for the limited dry farming on Saint Mary's Prairie, and areas naturally subirrigated, virtually all land being cropped in the East Kootenays is irrigated.

Forests are an important resource in the East Kootenays, and logging in the Rocky and Purcell mountains supports several sawmills and a pulp mill.

Mining is another very important industry in the East Kootenays, with major mines at Kimberley and in the Elk Valley. Coal and lead/zinc are the main minerals being extracted.

The mountainous topography of the East Kootenays, coupled with favourable climate, attractive lakes and rivers, variety in vegetative cover and impressive scenery, results in the area having a high significance for recreational activities. Hiking, camping, picnicking, skiing, swimming and boating are all popular recreational activities. The area is within a 2 to 3 hour drive of Calgary, and, in its northern portion especially, serves as a popular recreation area for Calgarians. The area also contains two large parks, Kootenay National Park and Assiniboine Provincial Park, as well as several other smaller, but highly attractive, high elevation provincial parks. Recreation in the East Kootenays is more fully discussed in Collins, 1981.

An abundance of winter range areas in open and semi-open forests in the main valleys, and large areas of wooded, relatively isolated summer ranges, makes the East Kootenays a prime area for wildlife such as deer and elk. Wildlife of the East Kootenays is fully discussed in Demarchi, 1986.

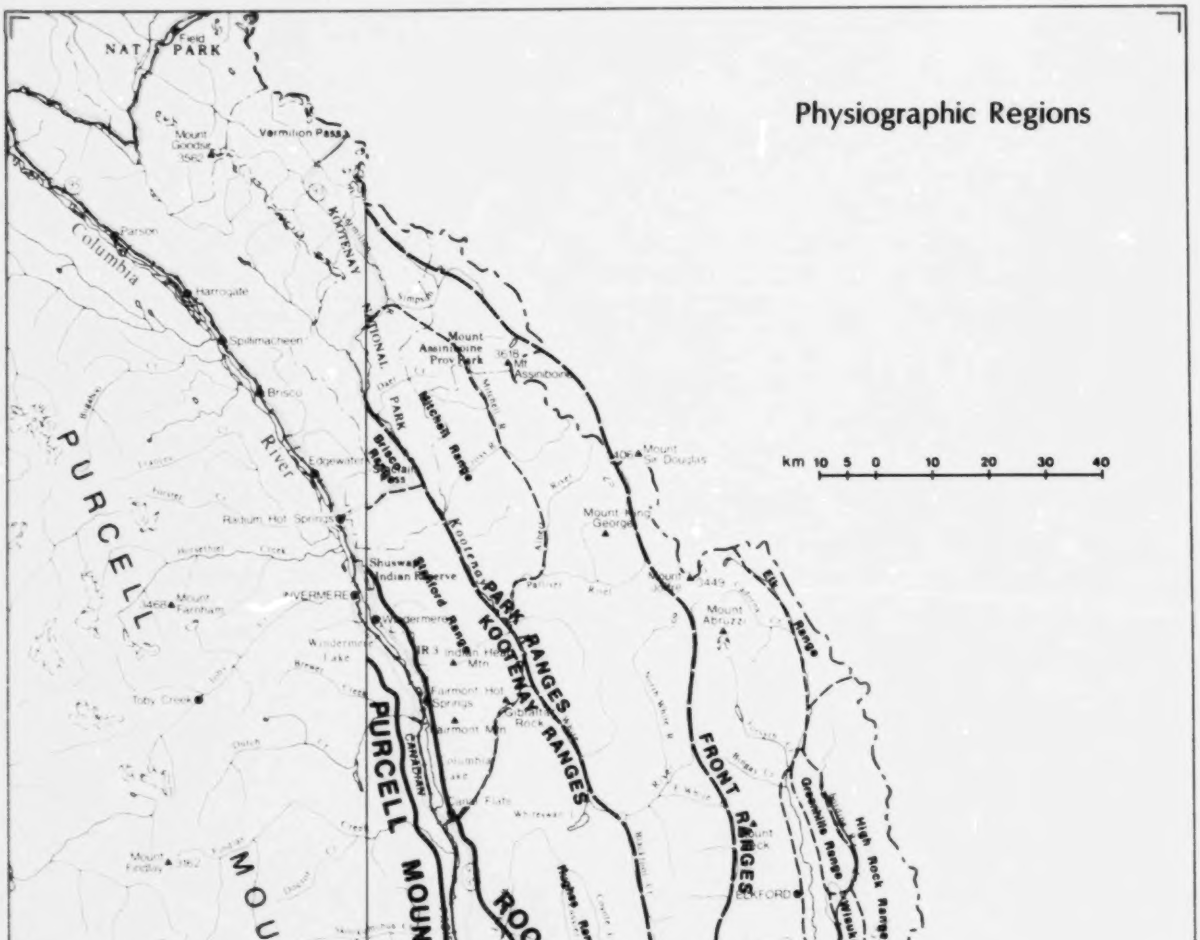

Physiographic Regions
km 10 5 0 10 20 30 40
NAT PARK
Field
Mount Goodsir 3562
Vermilion Pass
KOOTENAY
NATIONAL PARK
Parson
Columbia
Harrogate
Spillimacheen
Brisco
River
Edgewater
Radium Hot Springs
Shuswap Indian Reserve
INVERMERE
Windermere
Windermere Lake
Mount Farnham 3468
Toby Creek
Fairmont Hot Springs
Fairmont Mtn
Columbia Lake
Canal Flats
Mount Findlay 3162
Skookumchuck
Wasa
KIMBERLEY
IR 1
Marysville
Wycliffe
Fort Steele
Mt Fisher
The Steeples
CRANBROOK
Jaffray
Galloway
Morrissey
Elko
Waldo
Grasmere
Roosville
Newgate
Mount Fitzpatrick
Moyie L
Moyie
Yahk
Kingsgate
CRESTON
Indian Reserve
Wynndel
McConnel
Snowcrest Mtn 2865
Meachen
St Mary
Kootenay
Lake
Riondel
Crawford Bay
Boswell
532
Mount Assiniboine Prov Park
Mt Assiniboine 3618
Mount Sir Douglas
Mount King George
Mount Joffre 3449
Mount Abruzzi
ELKFORD
SPARWOOD
Natal
Crowsnest
Hosmer
FERNIE
Fernie Basin
Coal Creek
Corbin
Flathead Basin
Koocanusa
PURCELL MOUNTAINS
PURCELL MOUNTAINS
ROCKY MOUNTAINS
ROCKY MOUNTAIN TRENCH
PURCELL MOUNTAINS
PARK RANGES
KOOTENAY RANGES
FRONT RANGES
FRONT RANGES
BORDER RANGES
Mitchell Range
Brisco Range
Stanford Range
Hughes Range
Lizard Range
Elk Range
Greenhills Range
High Rock Range
Wisukitsak - Erickson Range
Flathead Range
McGillivray Range
Yahk Range
Galton Range
MacDonald Range
Clark Range
U.S.A.

Figure 1.2 Physiographic regions of the East Kootenay area (after Holland, 1976).

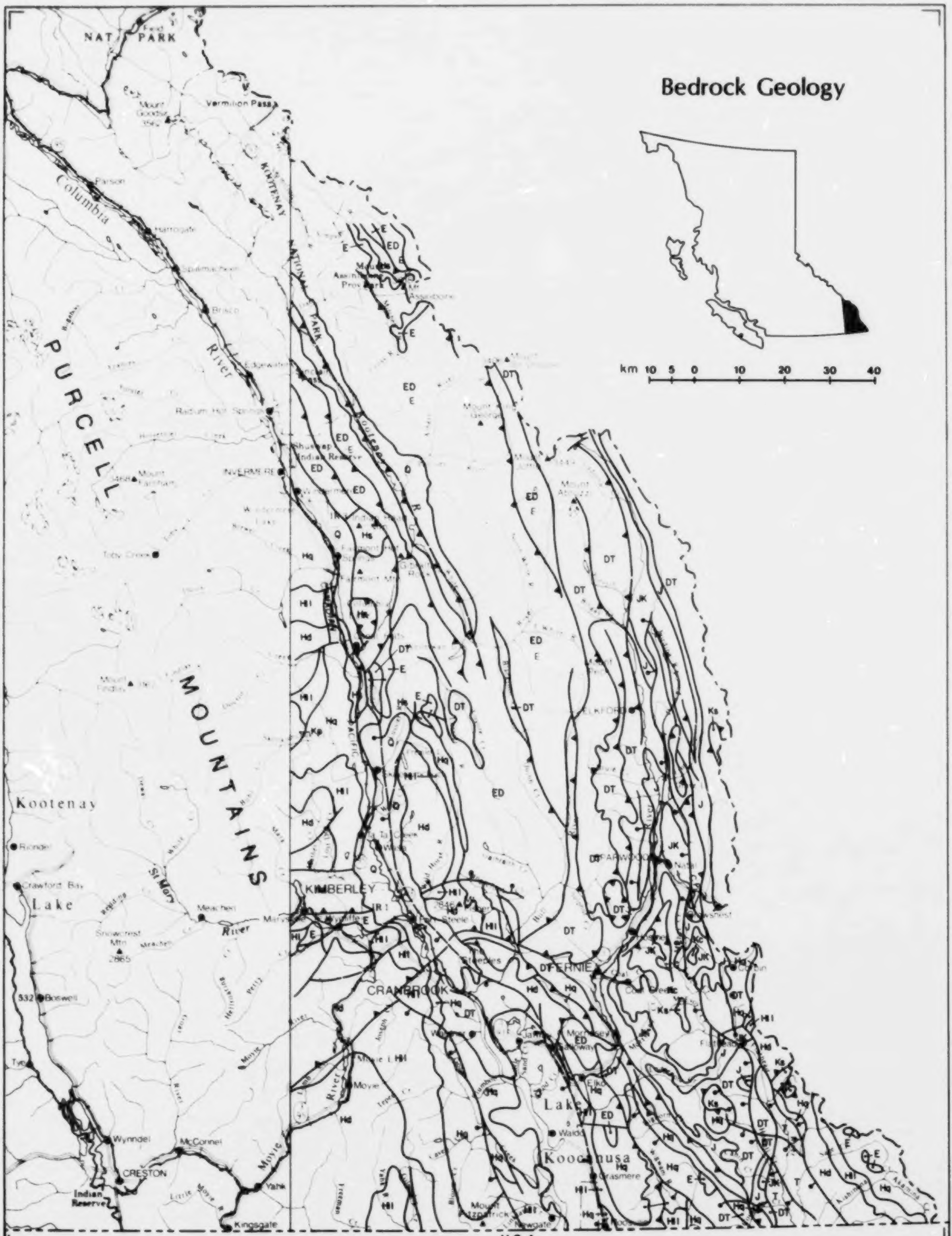
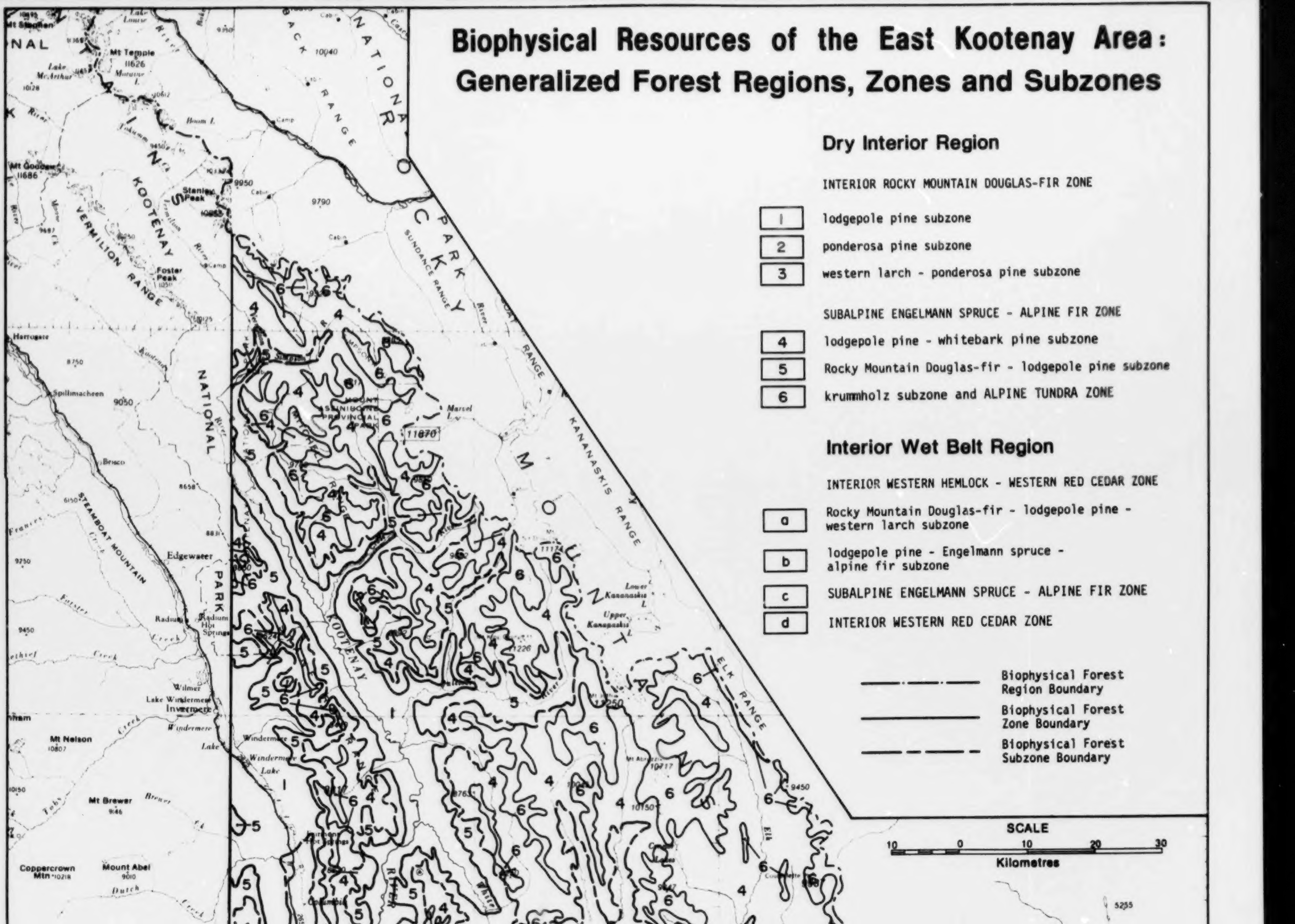

Bedrock Geology
km 10 5 0 10 20 30 40
NAT. PARK
Vermilion Pass
KOOTENAY NATIONAL PARK
Columbia River
Parson
Harrogate
Spillimacheen
Brisco
Edgewater
Radium Hot Springs
INVERMERE
Windermere
Mount Farnham
3468
Toby Creek
PURCELL
MOUNTAINS
Kootenay Lake
Riondel
Crawford Bay
Snowcrest Mtn 2865
Meachen
St Mary River
532 Boswell
Tye
Wynndel
CRESTON
Indian Reserve
McConnell
Yahk
Kingsgate
Moyie
KIMBERLEY
CRANBROOK
Wardner
Fort Steele
Wasa
Jaffray
Elko
Waldo
Grasmere
Lake Koocanusa
FERNIE
ELKFORD
Natal
Mount Assiniboine
U.S.A.
ED
E
DT
JK
J
Ks
Hq
Hl
Hd
Hs
Kp
Q
T

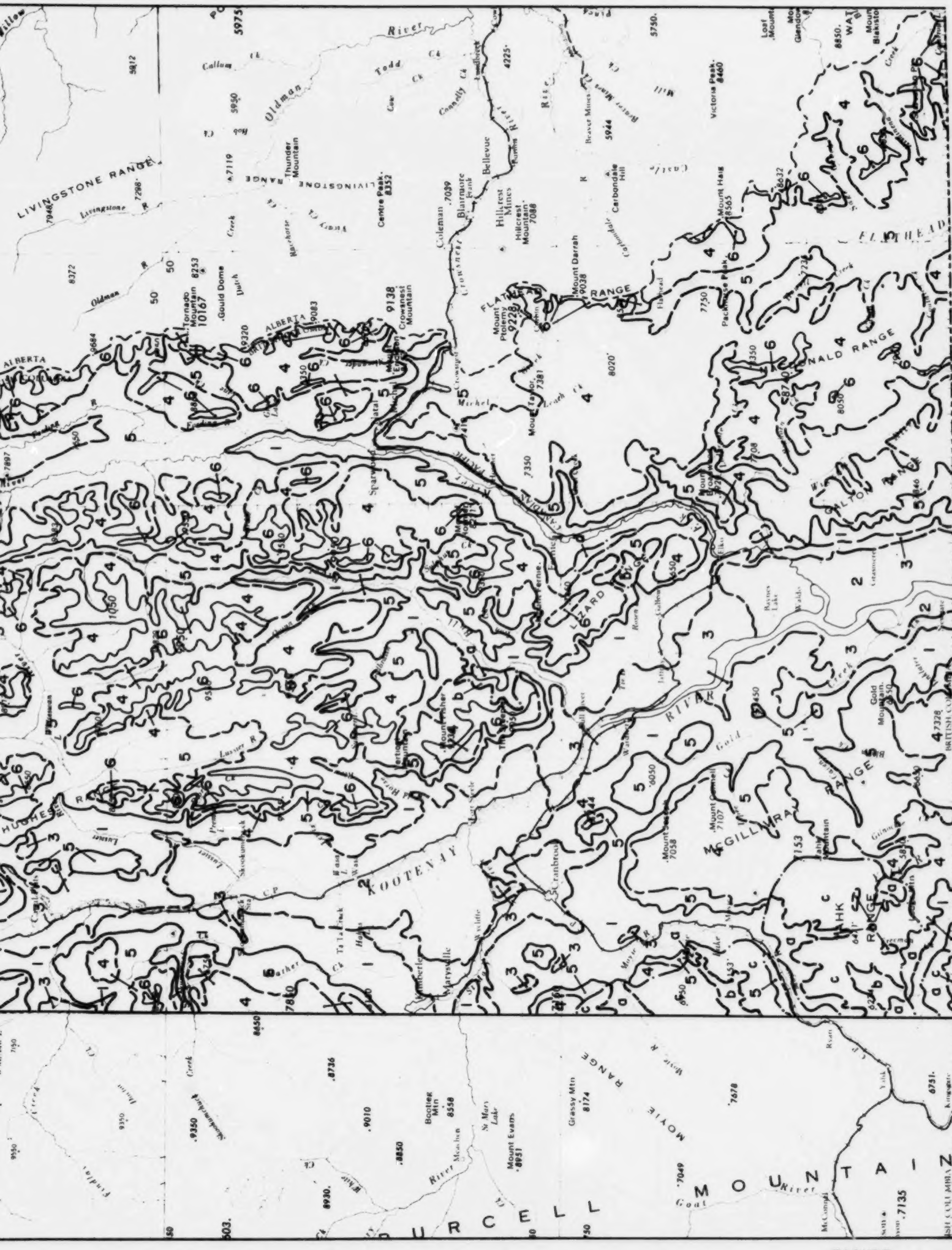
Figure 1.3. Generalized bedrock geology of the East Kootenay area.

LEGEND

QUATERNARY AND RECENT (present to 2.5 million yr B.P.)	
Q	Glacial and post-glacial deposits
TERTIARY (2.5 to 65 m.y.)	
T	Sandstone, conglomerate
CRETACEOUS (65 to 136 m.y.)	
Ks	Sandstone, shale
Kp	Quartz monzonite, granite
Kc	Sandstone, shale, coal conglomerate
JURASSIC-CRETACEOUS (190 to 65 m.y.)	
JK	Sandstone, siltstone, shale, coal conglomerate (Kootenay Formation)
JURASSIC (136 to 190 m.y.)	
J	Shale, siltstone, sandstone, limestone (Fernie Group)
DEVONIAN to TRIASSIC (395 to 190 m.y.)	
DT	Limestone, shale, dolomite, sandstone
CAMBRIAN to DEVONIAN (570 to 345 m.y.)	
ED	Limestone, shale, dolomite
CAMBRIAN (570 to 500 m.y.)	
E	Quartzite, limestone, phyllite, argillite
PROTEROZOIC (>570 m.y.)	
Hs	Sandstone, conglomerate, limestone
Hq	Quartzite, argillite, dolomite, siltstone
Hl	Limestone, argillite, quartzite, andesitebreccia, tuff
Hd	Limestone, dolomite, quartzite, argillite
▲▲▲▲▲	Thrust faults
┴┴┴┴	Normal faults

Biophysical Resources of the East Kootenay Area: Generalized Forest Regions, Zones and Subzones


Dry Interior Region
INTERIOR ROCKY MOUNTAIN DOUGLAS-FIR ZONE
1 lodgepole pine subzone
2 ponderosa pine subzone
3 western larch - ponderosa pine subzone
SUBALPINE ENGELMANN SPRUCE - ALPINE FIR ZONE
4 lodgepole pine - whitebark pine subzone
5 Rocky Mountain Douglas-fir - lodgepole pine subzone
6 krummholz subzone and ALPINE TUNDRA ZONE
Interior Wet Belt Region
INTERIOR WESTERN HEMLOCK - WESTERN RED CEDAR ZONE
a Rocky Mountain Douglas-fir - lodgepole pine - western larch subzone
b lodgepole pine - Engelmann spruce - alpine fir subzone
c SUBALPINE ENGELMANN SPRUCE - ALPINE FIR ZONE
d INTERIOR WESTERN RED CEDAR ZONE
Biophysical Forest Region Boundary
Biophysical Forest Zone Boundary
Biophysical Forest Subzone Boundary
SCALE
10 0 10 20 30
Kilometres
ROCKY MOUNTAINS
KOOTENAY NATIONAL PARK
NATIONAL PARK
BACK RANGE
SUNDANCE RANGE
KANANASKIS RANGE
ELK RANGE
VERMILION RANGE
STEAMBOAT MOUNTAIN
KOOTENAY
Mt Temple 11626
Mt Goodsir 11686
Lake McArthur
Lake Louise
Stanley Peak
Foster Peak
Mount Assiniboine Provincial Park
11870
Harrogate
Spillimacheen
Brisco
Edgewater
Radium Hot Springs
Wilmer
Lake Windermere
Invermere
Windermere
Windermere Lake
Mt Nelson 10807
Mt Brewer 9146
Mount Abel 9010
Coppercrown Mtn 10218
Lower Kananaskis L
Upper Kananaskis L
Marvel L
Elk
White
River
9050
9790
10040
8750
8658
6150
9750
9450
9450
5255


LIVINGSTONE RANGE
Oldman River
Thunder Mountain
Centre Peak 8352
Tornado Mountain 10167
Gould Dome 8253
Crowsnest Mountain 9138
ALBERTA
Coleman
Blairmore
Frank
Bellevue
Hillcrest Mines
Hillcrest Mountain 7088
Beaver Mines
Carbondale Hill
Mount Darrah 9038
Victoria Peak 8400
Mount Haig 8565
FLATHEAD RANGE
FLATHEAD
Mount Ptolemy 9228
Mount Taylor 7381
Sparwood
Fernie
Elko
LIZARD RANGE
GALTON RANGE
MACDONALD RANGE
Baynes Lake
Grasmere
Waldo
KOOTENAY RIVER
Gold Mountain
Cranbrook
Marysville
Kimberley
Wycliffe
Ta Ta Creek
HUGHES RANGE
MCGILLIVRAY RANGE
Mount Connell 7107
YAHK RANGE
Moyie Lake
MOYIE RANGE
Grassy Mtn 8174
Bootleg Mtn 8558
Mount Evans 8951
St Mary Lake
Kingsgate
BRITISH COLUMBIA
MONTANA
IDAHO
URCELL MOUNTAIN

FIGURE

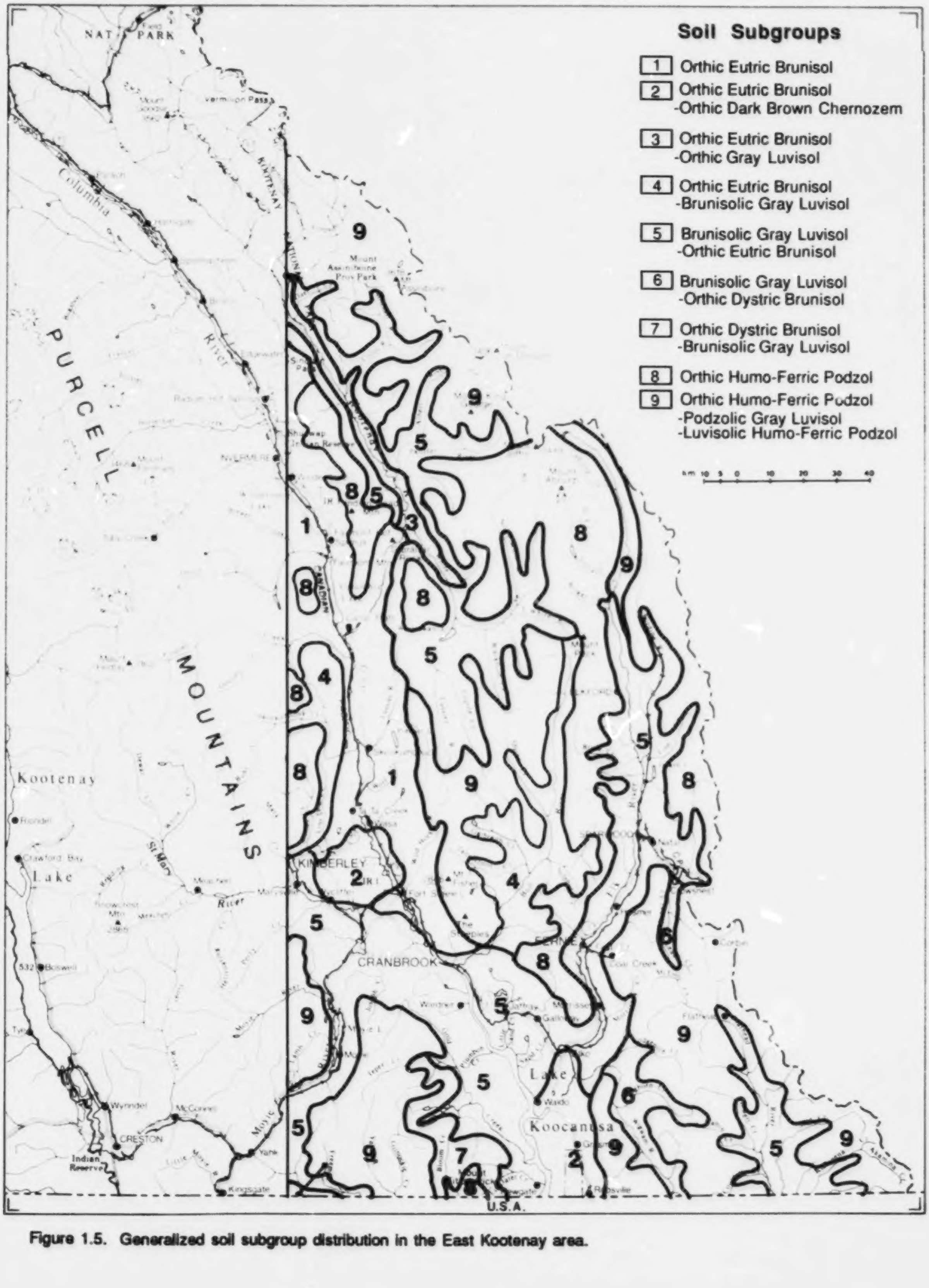

Soil Subgroups
1 Orthic Eutric Brunisol
2 Orthic Eutric Brunisol -Orthic Dark Brown Chernozem
3 Orthic Eutric Brunisol -Orthic Gray Luvisol
4 Orthic Eutric Brunisol -Brunisolic Gray Luvisol
5 Brunisolic Gray Luvisol -Orthic Eutric Brunisol
6 Brunisolic Gray Luvisol -Orthic Dystric Brunisol
7 Orthic Dystric Brunisol -Brunisolic Gray Luvisol
8 Orthic Humo-Ferric Podzol
9 Orthic Humo-Ferric Podzol -Podzolic Gray Luvisol -Luvisolic Humo-Ferric Podzol
km 10 5 0 10 20 30 40
NAT. PARK
Vermilion Pass
Columbia
PURCELL
MOUNTAINS
River
INVERMERE
Kootenay
Lake
KIMBERLEY
CRANBROOK
FERNIE
Koocanusa
CRESTON
Indian Reserve
Moyie
U.S.A.

Figure 1.5. Generalized soil subgroup distribution in the East Kootenay area.

1.2 OBJECTIVES OF THE SOIL SURVEY

The soil survey of the East Kootenay area was undertaken during 1975 as part of a program to map the soil resources of the province of British Columbia at a reconnaissance map scale. Specific objectives included:

- Identification and description of the soil associations that occur and their characterization with regard to properties, forest zonation (vegetation cover), surficial (parent) materials, bedrock type and climatic conditions;
- Mapping of the identified soil associations to show their distribution in the landscape, including determining the relative proportions of each soil association component in the soil map delineations (polygons); and
- Prediction of soil and surficial material suitability (or limitations) and behaviour for specific land uses and activities.

CHAPTER TWO

SOIL MAPPING METHODOLOGY, DEFINITION OF SOIL ASSOCIATIONS, AND LEGEND AND MAP PREPARATION

This chapter describes the fieldwork methodology utilized in the East Kootenay soil survey, as well as explaining how soil associations, soil association components, soil legends and soil maps were derived.

2.1 FIELDWORK METHODOLOGY

Prior to the field season, all pertinent background information dealing with adjacent and/or previous soil surveys, bedrock geology, terrain (surficial geology), physiography, and forest zonation was assembled and analyzed in order to conceptualize the framework for developing and mapping soil associations. In areas where terrain (surficial material) mapping was not already available, preliminary terrain delineations were stereoscopically plotted on 1:63 360 scale black and white aerial photographs. The preliminary delineations were later field verified (and modified, if needed). All road access was utilized while horseback, foot and helicopter transects were made across areas lacking road access. The relative degree of access is depicted in Figure 2.1.

After the preliminary Terrain mapping had been verified and where terrain mapping had been previously completed, soils fieldwork consisted of soil description, soil sampling and ancillary data collection within the framework of the pre-mapped terrain delineations. Where access permitted, at least one soil data collection site was investigated in each map delineation. Data from these sites were annotated on the aerial photographs, or on 1:50 000 terrain maps, and entered on standard soil description forms. Data routinely recorded included taxonomic soil development, soil texture, soil drainage class, slope, forest subzone, bedrock type and surficial (parent) material. Later, when the soil map was being compiled, this data was utilized to determine the appropriate soil association component(s) applied to the individual map delineations.

One hundred and nineteen soil profiles were described in detail and sampled for chemical and physical analysis and include all of the more important soil associations defined. Summaries of data collected for each soil association are given in the soil association descriptions in Chapter Four. All the detailed soil profile descriptions, and the results of the physical and chemical analyses are stored in the B.C. Soil Information System. During the field program, many 'grab-samples' were collected for specific analysis, in order to quantify chemical and physical estimates made in the field.

2.2 CRITERIA FOR DEFINING SOIL ASSOCIATIONS

By definition, biophysical soil associations (hereafter referred to as soil associations) are composed of related soil subgroups developed on similar soil parent material under similar climatic conditions (as expressed by forest zonation), but having unlike characteristics due to variations in topographic position, soil drainage, alkalinity, depth to bedrock, salinity and age.

The hierarchy for differentiating soil associations in the East Kootenays is depicted in Figure 2.2. The first subdivision is based on major physiographic regions (Holland, 1976). Within these natural regions, erosional and depositional processes, patterns and types of bedrocks and geologic history are similar, thus providing a basic regional framework for soil association definition.

The next subdivision in the hierarchy is based on forest zonation (both zones and subzones). The zonation is a surrogate for defining regional climatic differences and helps determine the geographical extent of the soil associations. Forest zones are defined on the basis of climatic climax tree species,

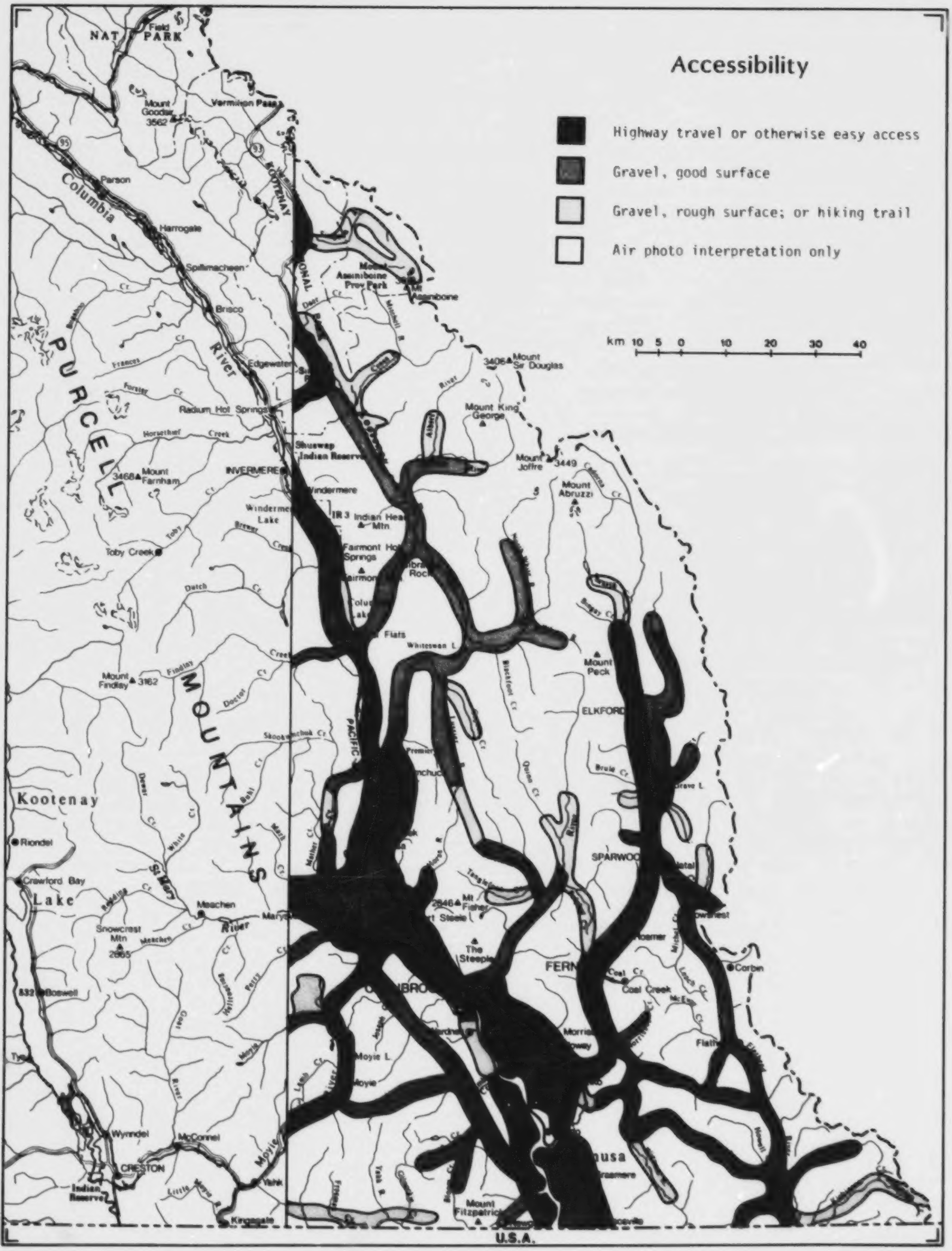

Accessibility
■ Highway travel or otherwise easy access
▨ Gravel, good surface
□ Gravel, rough surface; or hiking trail
□ Air photo interpretation only
km 10 5 0 10 20 30 40
NAT PARK
Field
Mount Goodsir 3562
Vermilion Pass
95
93
KOOTENAY
Columbia
Parson
Harrogate
Spillimacheen
Brisco
Edgewater
PURCELL
MOUNTAINS
River
Radium Hot Springs
Mount Assiniboine Prov Park
Mt Assiniboine
3406 Mount Sir Douglas
Mount King George
Mount Joffre 3449
Mount Abruzzi
Shuswap Indian Reserve
INVERMERE
3468 Mount Farnham
Windermere
Windermere Lake
IR 3 Indian Head Mtn
Toby Creek
Fairmont Hot Springs
Flats
Whiteswan L.
Mount Peck
ELKFORD
Mount Findlay 3162
Kootenay
Lake
Riondel
Crawford Bay
St Mary
Meachen
Marysville
Snowcrest Mtn 2865
2846 Mt Fisher
Fort Steele
The Steeples
SPARWOOD
FERNIE
Coal Creek
Corbin
Flathead
Boswell
Moyie L.
Moyie
Wynndel
McConnell
CRESTON
Indian Reserve
Yahk
Kingsgate
Mount Fitzpatrick
U.S.A.

Figure 2.1. Relative accessibility in the East Kootenay area.

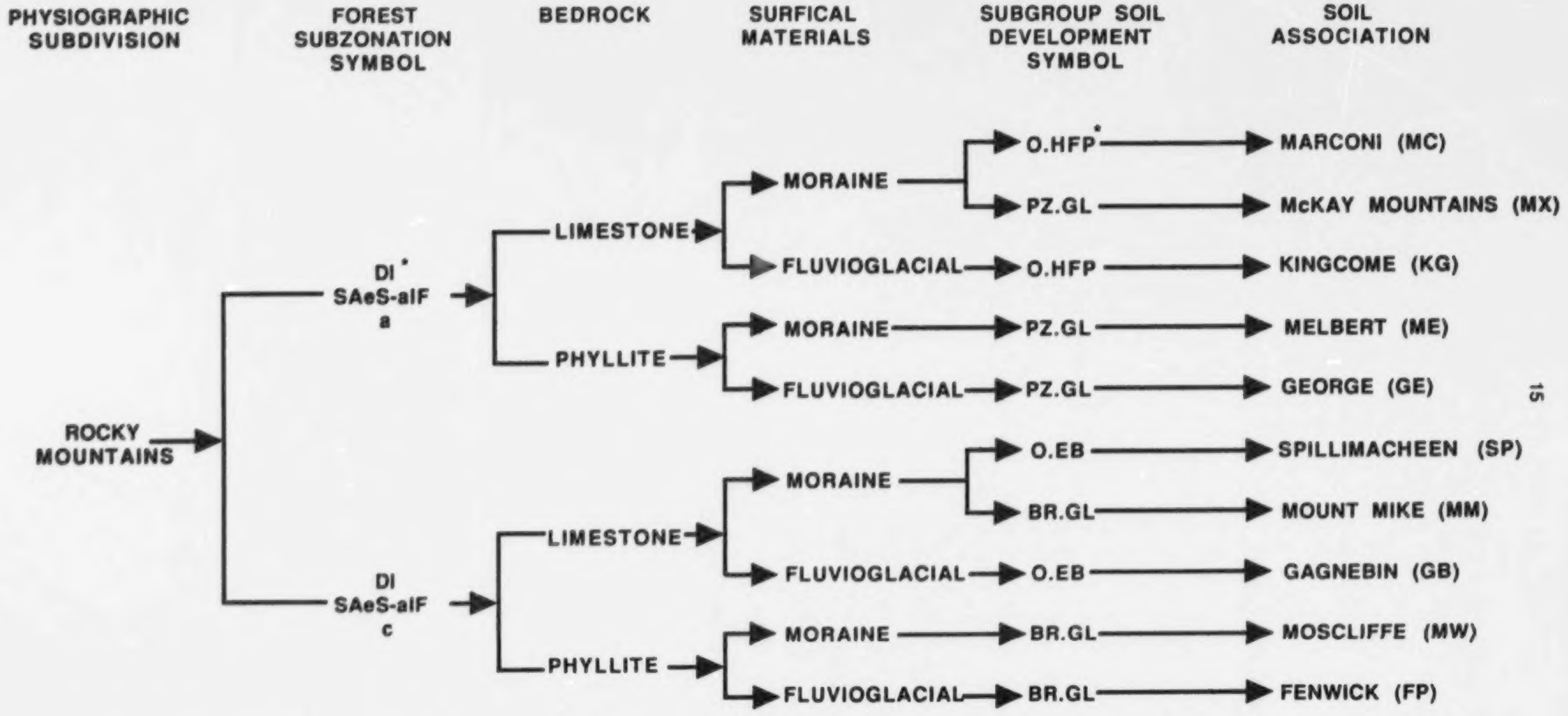

PHYSIOGRAPHIC SUBDIVISION
FOREST SUBZONATION SYMBOL
BEDROCK
SURFICAL MATERIALS
SUBGROUP SOIL DEVELOPMENT SYMBOL
SOIL ASSOCIATION
ROCKY MOUNTAINS
DI* SAeS-alF a
DI SAeS-alF c
LIMESTONE
PHYLLITE
LIMESTONE
PHYLLITE
MORAINE
FLUVIOGLACIAL
MORAINE
FLUVIOGLACIAL
MORAINE
FLUVIOGLACIAL
MORAINE
FLUVIOGLACIAL
O.HFP*
PZ.GL
O.HFP
PZ.GL
PZ.GL
O.EB
BR.GL
O.EB
BR.GL
BR.GL
MARCONI (MC)
McKAY MOUNTAINS (MX)
KINGCOME (KG)
MELBERT (ME)
GEORGE (GE)
SPILLIMACHEEN (SP)
MOUNT MIKE (MM)
GAGNEBIN (GB)
MOSCLIFFE (MW)
FENWICK (FP)

Figure 2.2. Example of the hierarchial system for defining soil associations in the East Kootenay area. * Forest subzonation and soil subgroup symbols are defined in Table 2.1.

Table 2.1 Soil subgroup, soil phase, forest zonation, surficial material and soil texture symbols used in figures and tables in the report.

Soil Subgroup Symbol	Soil Subgroup
O.MB	Orthic Melanic Brunisol
E.MB	Eluviated Melanic Brunisol
O.EB	Orthic Eutric Brunisol
E.EB	Eluviated Eutric Brunisol
O.SB	Orthic Sombric Brunisol
O.DYB	Orthic Dystric Brunisol
O.DB	Orthic Dark Brown
CA.DB	Calcareous Dark Brown
R.HG	Rego Humic Gleysol
O.G	Orthic Gleysol
R.G	Rego Gleysol
O.GL	Orthic Gray Luvisol
BR.GL	Brunisolic Gray Luvisol
PZ.GL	Podzolic Gray Luvisol
TY.F	Typic Fibrisol
TY.M	Typic Mesisol
GL.HFP	Gleyed Humo-Ferric Podzol
O.HFP	Orthic Humo-Ferric Podzol
S.HFP	Sombric Humo-Ferric Podzol
LU.HFP	Luvisolic Humo-Ferric Podzol
GL.HFP	Gleyed Humo-Ferric Podzol
O.FHP	Gleyed Ferro-Humic Podzol
S.FHP	Sombric Ferro-Humic Podzol
O.R	Orthic Regosol
CU.R	Cumulic Regosol
GLCU.R	Gleyed Cumulic Regosol
O.HR	Orthic Humic Regosol
CU.HR	Cumulic Humic Regosol
DB.SZ	Dark Brown Solonetz

Soil Phases

:ca	calcareous phase
:shli	shallow lithic phase
:vsli	very shallow lithic phase
:esli	extremely shallow lithic phase
:fh	ferro-humic phase

Forest Zonation Symbol	Forest Region, Zone and Subzone
DI ID a	Dry Interior Region: Interior Rocky Mountain Douglas-fir zone: lodgepole pine subzone
DI ID b	Dry Interior Region: Interior Rocky Mountain Douglas-fir zone: ponderosa pine subzone
DI ID c	Dry Interior Region: Interior Rocky Mountain Douglas-fir zone: western larch - ponderosa pine subzone
DI SAes-alF a	Dry Interior Region: Subalpine Engelmann spruce - alpine fir zone: lodgepole pine - whitebark pine subzone
DI SAes-alF b	Dry Interior Region: Subalpine Engelmann spruce - alpine fir zone: krummholz subzone
DI SAes-alF c	Dry Interior Region: Subalpine Engelmann spruce - alpine fir zone: Rocky Mountain Douglas-fir - lodgepole pine subzone
DI At	Dry Interior Region: Alpine tundra zone (subzones not determined)
IWB IwH-WC a	Interior Wet Belt Region: interior western hemlock - western red cedar zone: Rocky Mountain Douglas-fir - lodgepole pine - western larch subzone
IWB IwH-WC b	Interior Wet Belt Region: Interior western hemlock - western red cedar zone: lodgepole pine - Engelmann spruce - alpine fir subzone
IWB SAes-alF a	Interior Wet Belt Region: Subalpine Engelmann spruce - alpine fir zone (subzones not determined)

Table 2.1 (Cont'd) Soil subgroup, soil phase, forest zonation, surficial material and soil texture symbols used in figures and tables in the report.

Surficial Material

▧ - moraine (glacial till)
▥ - colluvial blanket, apron
▒ - colluvial veneer
▩ - fluvioglacial terraces, fans
▨ - floodplain

⁘ - glaciolacustrine
▥ - organic
▓ - fluvial fans
░ - fluvial terraces

Soil Texture

s - sand
ls - loamy sand
sl - sandy loam
fsl - fine sandy loam
sil - sil
sicl - silty clay loam

cl - clay loam
m - mesic organic
f - fibric organic
g - modifier indicating 20 to 50% gravelly fragments
vg - modifier indicating 50 to 90% gravelly fragments

while subzones are characterized by commonly occurring climax, or seral, species. Forest zonation in the East Kootenays is fully documented in Lea, 1984.

Bedrock group (bedrocks having similar physical and chemical characteristics) is the next stratification in the hierarchial system. East Kootenay soils often have distinctive textural and alkalinity characteristics, depending on the type of bedrock from which the parent material was derived. Even transported surficial materials such as morainal or fluvioglacial deposits often closely reflect the bedrock of the area in terms of their coarse fragment, sand, silt and clay content. Specific bedrock groups recognized in the East Kootenay area include 1) limestone and dolomite, 2) sandstone, quartzite and conglomerate, 3) shale, 4) siltstone, mudstone and argillite, and 5) phyllite. More generalized groups, (ie. medium to fine grained, non-calcareous bedrock) are employed where one of the previous groups does not dominate, or where a variety of bedrocks are closely intermixed. Characteristics of the bedrocks and the surficial materials derived from them are more fully discussed in Ryder, 1981.

Surficial material (soil parent material) is the next hierarchial category used to define soil associations. Surficial material groups used in the East Kootenays include 1) moraine (till), 2) colluvium (>1 m deep), 3) colluvial veneer (<1 m deep), 4) fluvioglacial deposits, fluvial terraces, fluvial fans, 5) floodplain deposits, 6) glaciolacustine deposits, and 7) organic materials. Each of these have distinctive properties that result in soils with consistent patterns of soil developments and physical, chemical and engineering characteristics.

The final category for distinguishing soil associations in the hierarchial classification is taxonomic soil development at the soil subgroup level, or a phase thereof. At the subgroup level, soils have distinctive and readily identifiable sequences of soil horizons that are important in classification, interpretation, and/or management. Commonly identified soil subgroups in the East Kootenays are described in Chapter Four.

In summary, a soil association consists of a group of soils occurring in a physiographic region, with specified climatic characteristics (as exhibited by forest zones and subzones), developed on specified surficial deposits (parent materials) derived from defined bedrock groups and, in general, having similar taxonomic development.

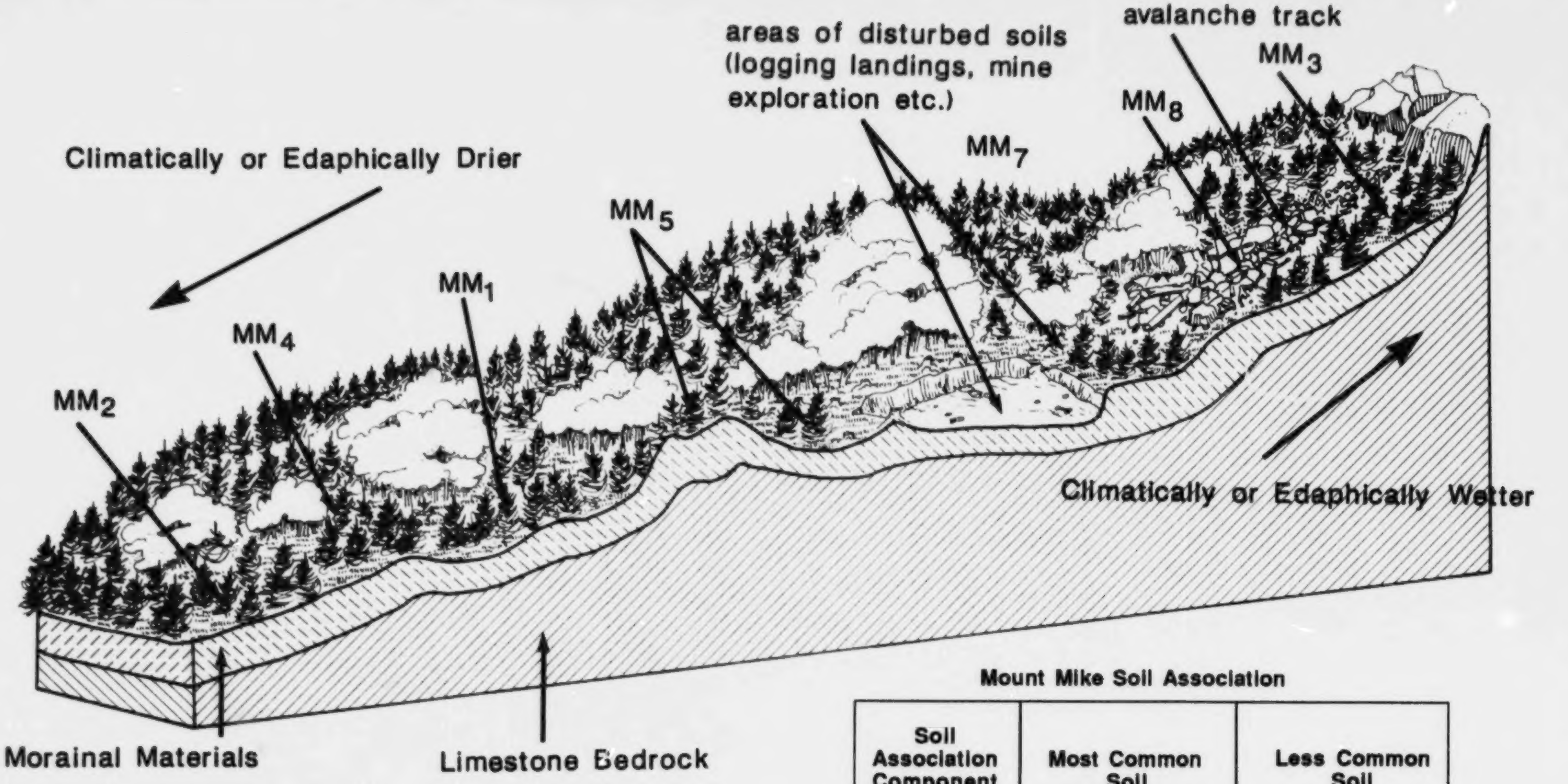
2.2.1 Soil Association Components

Individual soil associations are subdivided into soil association components based on the distribution of soil subgroup profiles that vary from the 'most common soil' (modal soil) subgroup in the association (Figure 2.3). The main soil developments that vary from the most common soil are referred to as the 'less common soil(s)' of that association. The most common soil consists of one subgroup and is the most commonly occurring soil subgroup in the soil association. For most components of a soil association, the most common soil occupies a greatest proportion of the area. The less common soil of one association may be the most common soil of another association - these relationships are highlighted in the individual soil association descriptions in Chapter Four.

Soil association components are identified by a numerical subscript following the soil association symbol (eg. MC1). Each subscript is consistently applied in the following manner:

Component 1 - consists of only the most common soil. No less common soil is identified. It generally occurs on deep materials that are well to moderately well drained and is the central (modal) soil in the soil association.

Component 2 - similar to component 1, but also includes a less common soil(s) characteristic of climatically or edaphically drier environments, but still in the same forest zone and subzone (Figure 2.3).


areas of disturbed soils (logging landings, mine exploration etc.)
avalanche track
MM$_3$
MM$_8$
MM$_7$
Climatically or Edaphically Drier
MM$_5$
MM$_1$
MM$_4$
MM$_2$
Climatically or Edaphically Wetter
Morainal Materials
Limestone Bedrock

Mount Mike Soil Association

Soil Association Component	Most Common Soil	Less Common Soil
MM$_1^*$	BR.GL**	
MM$_2$	BR.GL	O.GL
MM$_3$	BR.GL	PZ.GL
MM$_4$	BR.GL	O.EB,O.HFP
MM$_5$	BR.GL	BR.GL:shll
MM$_7$	BR.GL	O.R:ca
MM$_8$	BR.GL	CU.HR:ca

Figure 2.3. Schematic diagram depicting the relationship between components of the Mount Mike (MM) soil association.
* Soil association components are fully described in Chapter 4. ** Soil subgroup symbols are defined in Table 2.1.

Component 3 - similar to component 1, but also includes a less common soil(s) characteristic of climatically or edaphically wetter environments, but still in the same forest zone and subzone.

Component 4 - consists of the most common soil, but also includes a less common soil(s) of a different soil order. Both have developed under similar climatic environments. In the East Kootenays, such intermixtures of soil orders generally occur due to localized variations in soil texture.

Components 5 and 6 - are utilized where soil depths to underlying bedrock vary. Component 5 consists of the most common soil (usually deeper than 1 m over bedrock) with a less common soil that is between 50 and 100 cm deep over bedrock. In cases where the most common soil is 50 to 100 cm deep over rock, the less common soil is between 10 and 50 cm deep. Component 6 is the reverse of component 5, ie. the shallower soil is most common.

Component 7 - consists of the most common soil and a less common soil(s) which is regosolic. Component 7 is usually utilized where active fluvial or colluvial processes, or severe disturbances due to mining, logging or construction affect a significant portion of the landscape.

Component 8 - consists of the most common soil and a less common soil(s) which is typical of avalanche tracks and runout zones.

Components above 8 - consist of the most common soil and a less common soil(s) which identify non-typical, relatively uncommon soil conditions. The less common soil is defined as required in each individual soil association.

Note that a number of East Kootenay soil associations also occur in the adjacent Nelson and Lardeau map areas (Jungen, 1980, Wittneben, 1980). Component numbers are not consistent between the map areas, as a standardized component numbering system was not employed in earlier surveys. The user is therefore cautioned to consult the respective legends and reports when using maps from different project areas.

2.2.2 Soil Seepage Phases

Lower case letters are attached to soil association components to indicate those areas where localized seepage may be of importance for engineering or site capability assessment. In areas where a minor, but significant, proportion of a soil association component is affected by soil water seepage, a "v" is placed after the soil association component number (Figure 2.4). Where a dominant proportion of the soil association component is affected, a "w" is placed after the component number. Under these conditions, the seepage is insufficient to have a visible effect on soil profile development (ie. gleying/mottling is not evident) allowing the soil subgroup to remain unchanged. The soil seepage phase symbol "x" is utilized in soil association components which contain minor, but significant, areas characterized by imperfect to poor soil drainage and the presence of gleyed soils. The symbol "y" is placed after the soil association component number where gleyed soils are dominant. The soil seepage phases were employed to avoid having to define a considerable number of new soil association components to account for localized situations where the effects of seepage are significant.

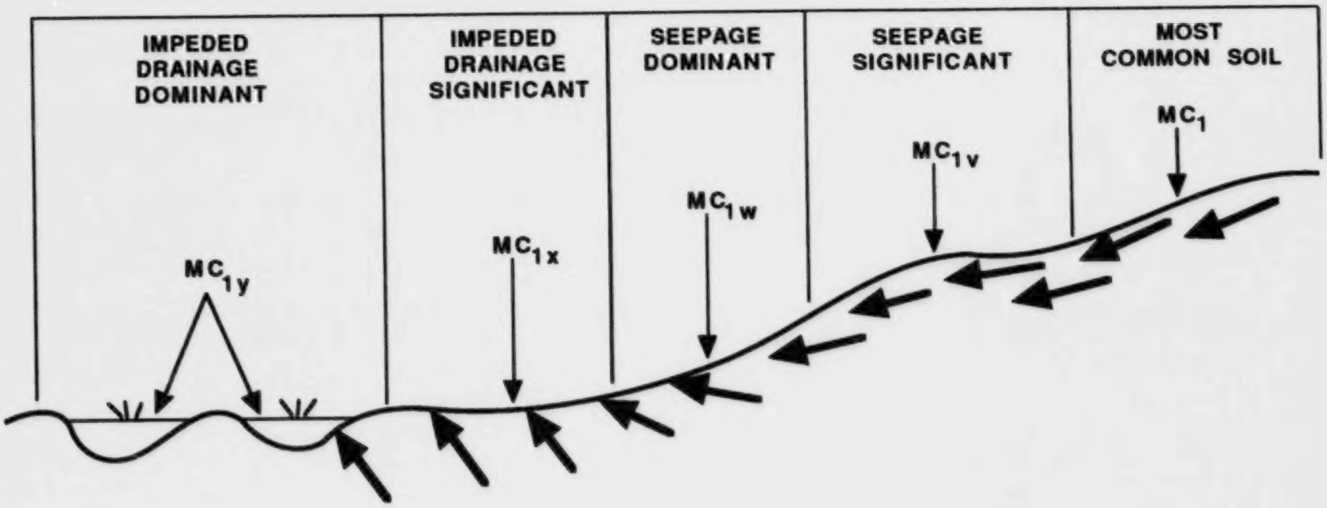

IMPEDED DRAINAGE DOMINANT
IMPEDED DRAINAGE SIGNIFICANT
SEEPAGE DOMINANT
SEEPAGE SIGNIFICANT
MOST COMMON SOIL
MC_1
MC_{1v}
MC_{1w}
MC_{1x}
MC_{1y}

Figure 2.4. Schematic diagram depicting the relationship between soil seepage phases in the Marconi (MC) soil association.

2.3 SOIL LEGEND

The basic steps involved in defining soil association with a hierarchy based on physiographic subdivision, forest zonation, bedrock group, surficial material and soil subgroup, have been discussed in Section 2.2. Each individual soil association identified in the soil legend is characterized by a specific combination of these factors.

Final compilation of field data and laboratory analyses resulted in a considerable number of soil association additions to, or deletions from, the preliminary versions of the soil legend. The resultant, distinctive, readily identifiable and consistently recurring soil associations were then organized into a finalized soil legend which, for each association, depicts forest zonation, soil parent material, most common soil textures, most common soil subgroup, and most common soil drainage. The components of each soil association are not described in the legend because of complexity and size limitations. They are however described in detail for each association in the report.

The generalized needs of soil map users will usually be met by the legend attached to each soil map. Those requiring more detailed information should use the legend in concert with the detailed soil association descriptions in the report.

2.4 SOIL MAP PREPARATION

The first step in compiling the soil maps involved transferring the terrain (surficial geology) delineations from mapped aerial photographs to 1:50 000 scale topographic base maps. Forest zonation boundaries were then superimposed to produce unique surficial materials - forest zone map polygons. Terrain boundaries were sometimes subdivided by forest zonation boundaries where the two did not readily coincide. One or more soil associations (up to three, occasionally four) at the component level was then assigned to each map polygon. Definition of how soil associations are determined is discussed in Section 2.2.

Each soil association is designated by a unique, one, two or occasionally three letter, capitalized soil association symbol. The symbol WY, for example, represents the Wycliffe soil association. Soil association components are indicated by numerical subscripts following the soil association symbol. Thus, the symbol WY_2 designates the climatically or edaphically drier component of the Wycliffe soil association. The presence of water seepage (where applicable) is indicated by one of the letters 'v', 'w', 'x or 'y' following the soil association component number. The symbol WY2v therefore designates that the climatically or edaphically drier component of the Wycliffe soil association has a minor, but significant proportion which is affected by seepage. The relative proportion of each soil association component in a soil map delineation is indicated by a superscript number from 1 to 9 following the soil association symbol. The number represents the proportion (out of 10) of the polygon occupied by that soil association component. Thus, $WY1^6$-$K2^4$ indicates that component 1 of the Wycliffe soil association occupies approximately 60% of the soil map polygon, while component 2 of the Kinbasket association occupies about 40%. Up to three soil association components are generally indicated in a soil polygon. Occasionally four are depicted where the soils are strongly contrasting and important in terms of land use. The topography of the soil polygon is depicted by one or more upper or lower case letters in the denominator of the soil map symbol. The letter A represents depressional to nearly level slopes while H indicates extreme slopes. The classes are more adequately defined in the soil map legend.

CHAPTER THREE

CLASSIFICATION OF EAST KOOTENAY SOILS AND SURFICIAL MATERIALS, THEIR GENERAL CHARACTERISTICS AND DISTRIBUTION

This chapter discusses the characteristics and classification of East Kootenay soils and surficial materials, and describes their regional distribution.

3.1 SOIL CLASSIFICATION SYSTEM

Soil is the naturally occurring, unconsolidated material on the surface of the earth. It is the result of surficial geologic deposits (soil parent material), climate (moisture and temperature), macro- and micro-organisms, and relief, all reacting with each other over a period of time. The resultant soil differs from the parent material in many physical, chemical, mineralogical, biological and morphological properties.

In the 1978 edition of the Canadian System of Soil Classification, the classification system utilized in this report, the Soil Order is the most generalized level of soil classification. All soils within one order have one or more basic soil profile characteristic in common. Eight of the Canadian soil orders occur in the East Kootenay area. Briefly summarized these are:

1. Chernozemic Order - grassland soils.

2. Solonetzic Order - saline soils with prismatic or columnar structure

3. Brunsolic Order - soils with weakly developed horizons.

4. Luvisolic Order - soils that have clay accumulation in the subsoil.

5. Podzolic Order - soils of the humid forest regions high in amorphous iron, aluminum and/or humus.

6. Regosolic Order - young soils with little horizon development.

7. Gleysolic Order - groundwater saturated soils.

8. Organic Order - soils composed primarily of organic plant material.

Soil orders are subdivided into two or more Soil Great Groups, each of which have certain morphological features in common and reflect a similar environment for soil development (pedogenic environment). The great groups are further subdivided into Soil Subgroups which are distinguished according to the arrangement of horizons within the soil profile.

Soil subgroups are the usual level of soil classification in the East Kootenays. A further subdivision or modifier, Soil Phases, is sometimes utilized in situations where the soil subgroup categories do not adequately describe the soils as they exist in nature. Commonly utilized phases include calcareous phase (soils having typical soil subgroup development, but are calcareous to the surface), and shallow lithic phase (soils having typical subgroup soil development, but are only 50 to 100 cm thick over bedrock). Other phases utilized are identified in Table 2.1.

Soils are classified to the soil subgroup (and phase) level so that distinct, recurring and recognizable soil development (horizon) sequences can be consistently identified. The relationship between various soil developments in the landscape is one of the basic criteria for defining soil associations.

3.2 DOMINANT SOIL FORMING PROCESSES IN THE EAST KOOTENAYS

The high level of calcium carbonate in many East Kootenay soil parent materials, in combination with low precipitation, tends to retard the development of soil horizons. Soils developed on these materials generally have shallow solums (<50 cm) since the precipitation and soil moisture regimes are not sufficient to eluviate (leach) the carbonates to depth.

On many, less calcareous, medium to moderately coarse textured materials, particularly those in more humid areas, weathering and eluviation of iron and aluminum compounds from surface horizons and redeposition deeper in the solum is the dominant forming process. This process has formed the soils of the Brunisolic and Podzolic Orders.

Moderately fine to medium textured materials are also undergoing eluviation processes, but in these cases, clay removal from upper horizons and redeposition at greater depth is the main soil forming process. This process is one of the main distinguishing criteria for soils in the Luvisolic Order.

Under grassland vegetation and semiarid soil moisture regimes, organic decomposition products accumulate in the surface soil. Such horizons characterize soils of the Chernozemic Order.

Soils permanently, or periodically, water saturated are subject to reducing conditions (oxygen deficiency) which produces the characteristic greyish, or bluish colours of soils of the Gleysolic Order. Reddish mottles may be present. When organic materials accumulate on the surface, soils of the Organic Order develop.

Where soil disturbances are frequent, or where flooding periodically adds surface material, soil horizons characteristic of mature soils have not developed. Such soils are classified as belonging to the Regosolic Order.

3.3 GENERAL CHARACTERISTICS OF SOIL ORDERS IDENTIFIED IN THE EAST KOOTENAYS

3.3.1 Chernozemic Order

In the East Kootenays, Chernozemic soils are limited in occurrence. They occur only on the floor of the Rocky Mountain Trench and in a few adjacent valleys where the soil moisture regime is sufficiently warm for their formation. They are generally located under grassland vegetation and in forest-grassland transitions where open areas of grass have been maintained for long periods. Soil parent materials are most commonly well to rapidly drained, gravelly fluvioglacial deposits and occasionally well drained, silty morainal or glaciolacustrine materials.

Chernozemic soils in the East Kootenays belong to the Orthic Dark Brown subgroup. They are characterized by well developed, organic matter enriched (from the incorporation of decomposition products of grasses), dark grayish brown surface soil horizons (Ah). Soil eluviation and illuviation is limited (due to relatively dry climate.) The upper solum is generally near neutral in reaction and has high cation exchange capacity and base saturation. On calcareous parent materials, the solum is relatively shallow (<50 cm) while on non-calcareous materials such as those on the flanks of the Purcell Mountains, solums are often substantially deeper.

Typical examples of soil associations in the Cherenozemic order are Saha (SA), Plumbob (P) and Hyak (H). General areas where Dark Brown Chernozems occur are shown in Figure 1.5. Landscape relationships of Chernozemic soils to soils of other orders, as well as the horizon sequence in a typical soil profile, are depicted in Figure 3.1.

3.3.2 Solenetizic Order

Solonetizic soils are of very minor occurrence in the East Kootenays. They are only found on the fringes of saline-alkaline ponds or lakes in the valley bottoms of major valleys. Evaporation, accompanied by shrinkage of the saline-alkaline water bodies, has exposed the saline parent materials in which there soils have developed. The relatively low precipitation in the semiarid valley bottoms is insufficient to leach the salts from the solum.

The soils are tentatively classified as Dark Brown Solonetz on the basis of a dark coloured, organic matter enriched, surface soil horizon (Ahk) underlain by a saline horizon with strong, columnar soil structure (Bnt). No solonetzic soil associations were established due to their very limited and sporadic occurrence. They do occur, however, as the less common soil in a few soil association components.

3.3.3 Brunsolic Order

Soils of the Brunisolic order have developed under a variety of climatic (forest zone and subzone) conditions. Their main distinguishing feature is a weakly developed solum in which the horizons are mostly Bm's. They most commonly occur in the semiarid to subhumid soil moisture regimes of valley floors and lower to middle mountain slopes, but are also found at higher elevations on relatively youthful soil parent materials. In an elevational sequence, Brunisols fall between the grassland Chernozems of the valley bottoms and the Podzols of higher, or more humid areas.

The highly calcareous parent materials so common in the Rocky mountains and in the Rocky Mountain Trench, combined with a relatively dry climate, has resulted in many Brunisolic soils having shallow, profiles with only limited eluviation of carbonates for the solum. These generally belong to the Orthic Eutric Brunisol soil subgroup. In areas of non-to-weakly calcareous parent materials, Brunisolic soils have more strongly developed horizonation, often much deeper solums, and are more acidic in the upper parts. They are generally identified as Orthic Dystric Brunisols and bear a strong resemblance to Podzols but do not meet the chemical criteria. Many East Kootenay Dystric Brunisols only marginally meet the pH criteria (pH <5.5 in 0.1 M $CaCl_2$). This is likely due to the mixing of some calcareous material into the dominantly non-calcareous parent materials which generally characterize areas with Dystric Brunisol soil development.

In some site specific situations, semiarid moisture regimes favour mixed grassland, herb and shrub vegetation, with the resultant Brunisolic soils having organic matter enriched surface soil horizons (Ah) that resemble, but not meet, the requirements for Chernozemic soils. These soils, when developed in calcareous parent materials and having pH's >5.5 (0.1M $CaCl_2$), are classified as Orthic Melanic Brunisols. Those in non-calcareous parent materials with pH's <5.5 are classified as Orthic Sombric Brunisols. Thin soils on upper mountain slopes with south or west aspects and severe summer soil moisture deficits, are also frequently Orthic Melanic or Orthic Sombric Brunisols.

Where precipitation is insufficient to eluviate carbonates from the solum, or where carbonates are being added through seepage, Eutric and Melanic Brunisols may be calcareous to the surface - these are identified as calcareous phases. In many areas of the East Kootenays, Brunisolic soil horizons have developed in the eluviated horizon (Ae) of soils of the Luvisolic order. These are, however, underlain by clay enriched, illuvial horizons (Bt) and consequently, are classified as Luvisols.

Orthic Eutric Brunisols are by far the most commonly mapped soil subgroup in the semiarid soil moisture regimes of most East Kootenay valley floors (Figure 1.5). On lower to middle mountain slopes with subhumid soil moisture regimes, Orthic Eutric Brunisols or Orthic Dystric Brunisols (on non-calcareous parent materials) most commonly occur on medium to moderately coarse textured soil parent materials. Finer textured soils commonly feature Luvisolic soil developments. At higher elevations, or in more humid areas (Interior Wet Belt), Brunsolic soils are confined to relatively youthful soils, or to areas subject to summer drought. At these locations mature soils generally belong to the Podzolic order.

General areas where Brunisolic soils occur is shown in Figure 1.5. The landscape relationships of Brunisolic soils to soils of other orders, as well as typical horizon sequences are depicted in Figures 3.1, 3.4, 3.6, 3.7 and 3.8.

3.3.4 Luvisolic Order

Soils of the Luvisolic order are fairly common in the East Kootenays (Figure 1.5). This is mainly due to the occurrence of large areas of medium and moderately fine (silty) textured soil parent materials derived from relatively fine grained bedrocks.

Luvisolic soils in the East Kootenays often only marginally meet the criteria for the Luvisolic order due to the relatively low percentages of clays in the soil parent materials. They have eluvial (leached) horizons (Ae), and illuvial (accumulation) horizons, that strongly resemble those of typical Luvisolic soils. The illuvial horizons, however, consist primarily of silt, rather than clay sized particles. Soils not meeting the criteria for the Luvisolic order are classified as Brunisols.

In more humid areas in the East Kootenays, horizons characteristic of the Brunisolic order (Bm), or Podzolic order (Bf), have developed in the eluviated horizons of Luvisols. Luvisolic subgroups listed in order from semiarid to humid moisture regimes are, Orthic Gray Luvisol, Brunisolic Gray Luvisol and Podzolic Gray Luvisol. Similarily, soil temperature regimes for the three subgroups range from cool to very cold. Brunisolic Gray Luvisol is the second most commonly occurring soil subgroup in the East Kootenays.

Where calcareous parent materials predominate, the solum depths are commonly relatively shallow (<50 cm). Luvisols developed in medium to moderately fine textured, non-calcareous soil parent materials often have illuviated horizons that are similar in structure and clay content to the parent material. The moderate to strong, subangular blocky soil structures characteristic of East Kootenay Luvisols restrict root penetration and retard downward water percolation.

The landscape relationships between Luvisolic soils and soils of other orders, as well as typical horizon sequences in Luvisolic profiles, are shown in Figures 3.2, 3.5, 3.7 and 3.8.

3.3.5 Podzolic Order

Podzolic soils are common at the higher elevations in the Rocky and Purcell mountains (Figure 1.5), but also occur at mid-slope elevations in the Interior Wet Belt portions of the Purcell Mountains. They lie between the Eutric and Dystric Brunisols, and Brunisolic Gray Luvisols of lower elevations and the Regosols, Melanic Brunisols and Sombric Brunisols of the mountain tops. They have commonly developed under stands of Engelmann spruce, subalpine-fir and lodgepole pine and, in the Purcells, have developed under western red cedar and western hemlock as well. The soils have humid to perhumid soil moisture regimes and soil temperature regimes ranging from cold to very cold. Soil textures generally vary from moderately coarse to moderately fine.

East Kootenay Podzolic soils generally feature a distinct, gray eluvial upper horizon (Ae) underlain by one or more reddish-brown, illuvial horizons (Bf) characterized by organic matter and amorphous iron and aluminum accumulation. They also have well developed organic surface horizons (LFH). Solum depths are often shallow (<50 cm) due to the calcareousness of the soil parent materials.

By far the most common great group is Humo-Ferric Podzol. At higher elevations and in seepage areas, Ferro-Humic Podzols also occur. In areas of medium to moderately fine textured soil parent materials, Luvisolic Humo-Ferric Podzols often occur. These have Podzolic soil development in a formerly eluviated horizon from which clays have been leached and are distinguished from Podzolic Gray Luvisols in having a greater depth (>50 cm) to the illuviated (Bt) horizon. Podzols near mountain summits often have organic enriched surface horizons (Ah). These are classified as Sombric Humo-Ferric Podzols, or if substantial organic matter incorporation in the subsurface has also occurred, Sombric Ferro-Humic Podzols.

The landscape relationships of Podzolic soils to soils of other orders, as well as typical horizon sequences, are depicted in Figures 3.2, 3.3, 3.5, and 3.6.

3.3.6 Regosolic Order

Soils of the Regosolic order are found throughout the East Kootenays where recent disturbances by nature, or man, has resulted in youthful soils without well developed soil horizons.

One of the two main processes producing Regosolic soils in the East Kootenays are colluvial processes which involve the downslope movement of materials in response to gravity. Active colluviation results in unweathered surficial (soil parent) materials at the earth's surface; talus, scree, avalanche tracks and deep and shallow colluvium are all included. The other dominant process is fluvial deposition, either as overbank flooding, or as fluvial fan formation.

Regosols containing buried organic matter enriched horizons are classified as Cumulic Regosols. Areas where the surface soils have been severely disturbed by man's activities are classified as Regosolic soils but on the soil maps are identified as Anthropogenic (man made, or man disturbed).

Two great groups of Regosolic soils occur in the East Kootenays. The Regosol great group is common in colluvial, fluvial and disturbed situations, while the Humic Regosol great group occurs in avalanche areas. The specific subgroups (and phases) in colluvial and fluvial situations are usually Cumulic Regosol; calcareous phase or Cumulic Regosol (on non-calcareous materials). Where buried surfaces are not evident, soils are classified as Orthic Regosols. Cumulic Humic Regosols are usual on avalanche tracks and runout zones that have soil horizons sequences restricted to organic matter enriched surface and buried horizons. On floodplains with imperfect soil drainage, Gleyed Cumulic Regosols are common and grade to the Gleysolic order when drainage becomes sufficiently restricted.

The landscape relationships of fluvial Regosolic soils to soils of other orders, as well as typical horizon sequences, are depicted in Figures 3.3 to 3.8 inclusive.

3.3.7 Gleysolic Order

In the East Kootenays, soils of the Gleysolic order are common on floodplains and also occupy depressional, moisture collecting sites in areas of morainal and fluvioglacial surficial material. Soil drainage ranges from poor to very poor due to water tables at or near the soil surface for long periods. The presence of excess water and anerobic condition results in permanent, or periodic reducing conditions and causes the characteristic gray or bluish-gray subsurface soil colours and reddish mottles. Sedges and mosses are characteristic vegetation on soils with peraquic and aquic soil moisture regimes, whereas alder, cottonwood and willow are common in areas where the water table recedes somewhat for a significant portion of the year.

Gleysolic soils in the East Kootenays usually consist of calcareous, strongly gleyed surficial (soil parent) materials with little or no horizon development. These are classified as Rego Gleysol: calcareous phase. Areas where organic matter enriched mineral surfaces occur are classified as Rego Humic Gleysols. Areas where peaty surfaces have accumulated are classified as peaty phases of the appropriate Gleysolic subgroup.

Gleysolic soils occur only as components of other soil associations; no Gleysolic soil associations have been defined. The landscape relationships between Gleysolic soils and soils of other orders, as well as a typical horizon sequence, is depicted in Figure 3.1.

3.3.8 Organic Order

Soils of the Organic order occur where decay of organic residues is slower than the rate of accumulation. Decay in is inhibited by lack of oxygen due to water saturation for all, or most, of the year. Soil moisture regime is peraquic and soil drainage is very poor.

In the East Kootenays, Organic soils have developed primarily in fens and bogs and consist of layers of organic matter is various stages of decomposition. They commonly occur in water accumulating depressions characterized by underlying surficial materials with low permeabilities. Except in flat-floored, large valleys at higher elevations, Organic soils commonly occur only as small pockets, and are generally mapped as less common soils in map delineations composed of soils developed in moraine, glaciolacustrine or floodplain surficial materials.

Organic soils with partly decomposed (mesic) middle tiers (40-120 cm depth) are by far the most common organic development and are classified as Typic Mesisols. On floodplains, Rego Gleysols, or peaty phases of Rego Gleysols commonly occur at the edges of areas of Organic soils.

The landscape relationships of Organic soils with soils of other orders, as well as typical horizon sequences are depicted in Figure 3.1, 3.2, 3.7 and 3.8.

3.4 REGIONAL DESCRIPTIONS OF SURFICIAL MATERIALS AND SOILS

Broad areas of the East Kootenays are characterized by distinctive types of bedrock (Figure 1.3) surficial materials (Ryder, 1981) and soil development (Figure 1.5). In this section, surficial materials, the soils formed on them, and their constraints or capabilities for various land uses are generally described in the context of:

1) the Rocky Mountain Trench,
2) the limestone-dolomite areas of the Rocky Mountains,
3) the Fernie and Flathead basins,
4) the Upper Kootenay and White river valleys, and
5) the Purcell Mountains.

In the following discussion, when intensive land use in mentioned, it refers to development that considerably alters the local environment. Such developments include urban settlement, roads, construction of recreational facilities such as playgrounds, and bringing land into agricultural production. Extensive land uses include those where the local environment is not altered significantly, or permanently, or where use is periodic rather than continuous. Logging and associated forest management activities, extensive recreational activities such as hiking and wildlife viewing, are considered to be extensive land uses.

3.4.1 The Rocky Mountain Trench

The floor of the Rocky Mountain Trench (Figure 1.2) includes extensive areas of gravelly fluvioglacio and fluvial terraces and fans, as well as large areas of gravelly silty and silty morainal deposits (Figure 3.1). The Kootenay and Columbia rivers are flanked by extensive silty glaciolacustrine terraces commonly characterized by incised gullies and unstable escarpments. Rubbly, deep and shallow colluvial deposits are relatively limited, except on the mountain slopes flanking the Trench where deep colluvium commonly blankets the lower slopes and colluvial veneers cover the upper slopes (Figure 3.1). The extensive floodplains of the Kootenay and Columbia rivers are mostly silty, although gravelly deposits occur along the Kootenay River south of Canal Flats. Surficial materials in the Rocky Mountain Trench are usually calcareous.

The fluvioglacial and fluvial terraces and fans are often capped by silty to sandy eolian or fluvial veneers (eg., Elko soil association). Land surfaces are generally undulating to level with relatively frequent gully dissection, while the terrace escarpments are steep and unstable. Some coarser textured fans and terraces lack surface veneers (eg. Fishertown soil association) and consequently, have droughty soils containing considerable quantities of coarse fragments. These latter soils are highly suited for urban settlement, intensive recreational development and forest management activities. They have, however, severe constraints that limit their use for septic tank drainage fields (eg. coarse textures). Forest growth is limited due to soil droughtiness and their potential for agriculture is also limited, both by stoniness and droughtiness. Soils developed on fans and terraces with fluvial or eolian veneers (Saha, Hyak, Elko and Keeney soil associations) are as suitable as the coarser textured non-veneered soils for settlement and intensive recreational development, while being somewhat superior for agriculture (especially if irrigated), forest growth and wildlife winter range, due primarily to improved soil moisture retention characteristics.

Topography of morainal soil parent materials on the valley floor varies from undulating (slopes commonly <25%) to drumlinized (slopes commonly >25%), while at the edges of the Trench, the morainal deposits blanket irregular bedrock surfaces (slopes commonly >25%). Some morainal materials contain considerable quantities of incorporated coarse fragments. Soils developed from the morainal materials (Plumbob, Wycliffe and Marmalade soil associations) are, if the topography is not too steep, moderately suited for settlement, intensive recreational development and forest management activities. Bearing strengths, coarse fragment contents, soil drainage and depth are moderately favourable for construction of dwellings and roads, while the somewhat restricted permeability does not unduly hinder septic tank drainage fields. Topography and stoniness commonly limit agricultural uses while the semiarid to sub-humid soil moisture regime limits forest growth.

Large areas of the floor of the Rocky Mountain Trench are characterized by morainal materials with somewhat finer textures and lower coarse fragment contents than those mentioned above. Soils developed on these deposits (Kinbasket and Flatbow soil associations) have somewhat more severe constraints that limit their use for residential settlement, septic tank drainage fields, recreational development, and forest management activities. They are also somewhat more readily eroded if disturbed and are less permeable.

Silty glaciolacustrine materials are common in the Rocky Mountain Trench and have topography that varies from nearly level (slopes commonly <8%) or undulating (slopes <25%) on terrace surfaces to gullied, eroded and steep (>70%) on escarpments. Soils developed on the terraces (Mayook and Abruzzi soil associations) are limited in their potential for settlement development, recreational uses and forest management activities, due to their potential for erosion when disturbed, unfavourable foundation and road subgrade characteristics and limited permeability. They are however, suited for agriculture, especially if irrigated. Forest growth is relatively slow, due to the semiarid soil moisture regime, while wildlife winter range values are generally high. Glaciolacustrine escarpments commonly suffer surface and subsurface erosion and mass movement processes, consequently, they are unsuitable for any intensive land uses.

Soils developed in the deep, rubbly colluvial deposits characteristic of the mountainsides (Colin Creek, Cervil and Caithness soil associations) generally have their suitability for settlement development, recreational development and forest management activities severely constrained by steep topography and potential surface erosion and mass movement. The soils are generally unsuited for agricultural uses and have only limited potential for forest growth, due to the semiarid soil moisture regime. Soils developed in colluvial veneers (Rockbluff, Big Fish and Rosen Lake soil associations) are even less suited in terms of capability or land use than are soils developed in the deeper colluvial deposits.

The floodplains of the Kootenay and Columbia rivers and their major tributaries have mostly silty, gleyed soils (Salishan and Nowitka soil associations) which are imperfectly to poorly drained and frequently flooded. Consequently, they are unsuited for urban settlement, intensive recreational development and agriculture (unless dyked and drained). Where imperfectly drained, they are locally suited for growth of deciduous tree species. Some areas have high value for wildlife winter range.

3.4.2 The Limestone - Dolomite Areas Of The Rocky Mountains

Steep mountain slopes composed of resistant limestone and dolomite are common throughout the Rocky Mountains. For general discussion, included are those parts of the Galton, MacDonald and Clark ranges in the project area; excluded are the Fernie and Flathead basins, and the Upper Kootenay and White River valleys (Figure 1.2). The surficial deposits are characterized by silty, calcareous morainal and deep, rubbly colluvial deposits on the lower mountain slopes and by shallow, rubbly colluvial veneers and exposed bedrock at the higher elevations (Figure 3.2). Valleys between mountain ridges tend to be broad and relatively flat-floored and often contain wide floodplains that are flanked by deep deposits of morainal and fluvioglacial materials.

The morainal deposits in the limestone - dolomite areas are most commonly blankets over hummocky, irregular bedrock surfaces. Slopes usually range between 25 and 70%. Soils developed in morainal deposits containing high proportions of sands and gravels include the Marmalade, Spillimacheen and Marconi soil associations. Primarily because of steep topography, these soils generally have moderate constraints limiting their uses for settlement development, intensive recreational development and forest management activities. Capability for agriculture is generally low due to adverse topography and stoniness, but in some areas, such as the more humid soil moisture regimes of higher elevations, forest capabilities are relatively high.

Large extents of somewhat more silt-and-clay-rich morainal deposits also occur in the limestone-dolomite areas of the Rockies. Soils developed on these deposits commonly have silty textures and relatively low coarse fragment contents (Flatbow, Mount Mike, and McKay Mountain soil associations). Where topography and soil drainage are favourable, these soils are also rated as having moderate constraints for the above mentioned activities. However, on steeper slopes, in wet areas, and where surface soil erosion or mass movement is evident, they are rated as having severe constraints.

The deep, calcareous blankets of rubbly colluvial deposits on lower slopes in the limestone-dolomite areas generally have severe constraints for settlement and recreational development, and forest management activities. They tend to be susceptible to surface erosion and mass movement processes when disturbed. The shallow solum soils that have developed on these materials (Cervil, Couldron and Columbine soil associations) are generally unsuited for agriculture due to the steep topography and excessive coarse fragments. However, forest productivity may be relatively high, especially in seepage receiving, lower slope positions, and in the humid soil moisture regimes of higher elevations.

Soil developed in rubbly colluvial veneers (Badshot, Big Fish and Ruault soil associations) have more severe constraints limiting their use for development, forest management or agriculture, than do the soils formed in deep colluvium. Forest growth is limited due to the rapid soil drainage and shallow rooting depth. Both deep and shallow colluvium have only moderate value as summer range of wildlife, due to usually closed forest canopies.

Gravelly fluvioglacial and fluvial fans and terraces in the main valleys of the limestone-dolomite areas commonly have sandy or silty fluvial or eolian cappings. Soils developed in these materials (Keeney, Gagnebin and Kingcome soil associations) are generally well suited for settlement or recreational development, forest management activities or agriculture (especially if irrigated). Subsoil textures are too coarse to effectively filter septic tank effluent and, in areas where the fluvial or eolian capping is absent, coarse texture and high coarse fragement content limits the agriculture capability. Forest productivity is also generally limited although, in localized seepage areas and in the humid soil moisture regimes at higher elevations, it is relatively high.

Floodplains are commonly characterized by gravelly, calcareous, moderately well to imperfectly drained soils subject to widely fluctuating water tables (Fireweed, Four Points and Festubert soil associations). These soils are unsuitable for settlemnt development due to regular flooding, but have some potential for extensive recreational activities, forestry, and wildlife winter range. Agricultural potential for extensive recreational activities, forestry, and wildlife winter range. Agricultural potential is limited by excessive soil water, flooding and coarse fragments, but forest capability may be quite high, especially for water tolerant deciduous species.

Soils derived from glaciolacustrine deposits (Abruzzi, Lancaster and Linten soil associations) are limited in extent. They are usually strongly dissected and often occur in seepage receiving positions and are consequently subject to surface erosion and mass movement processes, especially if disturbed. These soils generally have severe constraints for settlement, recreational and forest management activities. Where seepage is present, forest productivity is high, while areas with level to undulating topography have moderate agriculture capability.

3.4.3 The Fernie and Flathead Basins

The Fernie and Flathead basins (Figure 1.2) are characterized by a wide variety of often readily weathered bedrocks, which has produced a somewhat subdued topography (Figure 3.3). Areas where friable shales, mudstone, siltstone and coal occur have generally undulating to hummocky topography with slopes mostly between 15 and 50%. Areas where more resistant sandstone, quarzite and conglomerate outcrop feature steeper topography and slopes in excess of 50% are common (Figure 3.4).

Morinal materials are derived from a mixture of bedrock types in some valleys in the Fernie and Flathead basins. Soils developed in these deposits have textures, topography, sutiability for settlement and intensive or extensive recreational development, forest management constraints, and forestry, agriculture and wildlife capabilities that are similar to those for soils developed in silty morainal materials in the limestone-dolomite areas of the Rockies. Soils developed in these dark coloured morainal deposits include the Murdock, McLatchie and McQuaigly soil association.

Where extensive shale, mudstone or siltstone occurs, the soils developed in morainal materials (Cokato, Morrissette, Matkin, Melbert and Maguire soil associations) have moderately fine textures (silty clay loam) and relatively few coarse fragments. These soils are more highly susceptible to environmental damage from settlement development, recreational use, and forest management activities than are any of the previously discussed soils. Agricultural and forest capability are relatively high, due to the subdued relief, favourable soil moisture retention properties and relatively low coarse fragment contents.

Soils developed in sandstone, quartzite and conglomerate derived morainal deposits are commonly medium textured (gravelly sandy loam), occur on steeper topography and contain large proportions of coarse fragments (Mansfield, Maiyuk and Minitown soil associations). These coarser textured soils, if not excessively steep or wet, have the least constraints of any morainal derived soil for land uses such as settlement and recreation development and forest management. Forest productivity is limited, however, by relatively low soil moisture retention capacities, while agricultural capability is low due to steep topography, high coarse fragment contents and relatively coarse textures.

Soils developed in deep, shaly, colluvial deposits (Coal Creek, Corbin and Crossing soil associations) are even more fragile than soils derived from shaly morainal materials. Topography is somewhat subdued when compared to limestone-dolomite derived colluvium, due to rapid weathering of the shale bedrock. Slopes below 50% are common, but even on gentler slopes, evidence of surface soil erosion, gullying and mass movement processes is apparent. Constraints on intensive land uses are severe, although forest productivity values may be relatively high.

Soils developed in rubbly colluvium derived from sandstone, conglomerate or quartzite (Cummings, Coubrey and Conrad soil associations) are much less fragile than shaly colluviums but, due to excessive steepness and high proportion of coarse fragments, still have severe constraints for settlement and recreational development, and agriculture. Constraints for forest management and extensive recreational uses are less severe, due to relatively coarse textures and well drained soils.

Soils developed in shaly colluvial veneers (Rock Cleft, Racehorse and Roth Creek soil associations) are even more severely constrained for both intensive and extensive land uses than are soils weathered from deep, shaly colluvium. Soil developed in sandstone, quartzite or conglomerate derived colluvial veneers (Round Prairie, Brennan and Bunyon soil associations) are less fragile than soils developed in shaly colluvial veneers, but due to steep slopes, shallowness to bedrock, high coarse fragment contents and droughtiness, have constraints that severely limit their use for settlement and recreational development, forest management activities and agriculture. However, forest productivity is usually moderate, especially at the higher elevations where the soil moisture regime is moderate.

Weathering and erosion from shale outcroppings along the margins of major valleys in the Fernie and Flathead basins has resulted in relatively shallow, silt-and-clay-rich fluvial fans on the surfaces of gravelly fluvioglacial and fluvial terraces and fans in the valleys. Soils developed in these fans (Cadorna, Follock and Grizzly soil associations) are, despite their gentle topography (slopes <5% are common), very fragile with regard to soil compaction, puddling and surface erosion if disturbed. They are therefore considered to have moderate constraints for settlement and recreational development, and forest management activities. However, due to favourable topography, few coarse fragments and relatively high soil moisture retention capacities, these soils have high capabilities for agriculture where climate is not limiting. Forest productivity is also commonly high, especially in seepage receiving areas. Where logged or otherwise cleared, these soils also have high value as wildlife winter range.

Fluvioglacial and fluvial fans and terraces in areas of sandstone, conglomerate or quartzite bedrocks are coarse textured (gravelly loamy sand to gravelly sandy loam), and have only slight constraints for settlement or recreational development and forest management activities. The coarse textures, however, provide incomplete renovation of septic tank effluent. Low moisture retention capacities and stoniness limits both agricultural and forestry capability. Relatively high wildlife values occur where these droughty soils combine with southerly aspects to produce open, grassy vegetation.

Floodplain soils developed in surficial materials derived from shale (Frayn and Forum Mountain soil associations) are subject to flooding and have restricted soil drainage, as well as being fragile due to their relatively fine (silty clay loam) soil textures. These soils are considered to have severe constraints for settlement or recreational development, forest management and agriculture. Although soils developed on floodplains consisting of surficial materials derived from sandstone, conglomerate or quartzite (Follock and Font Creek soil associations) are coarser textured and less fragile than shale derived floodplain soils, they are still rated as having severe constraints for most land uses. However, both shale and sandstone derived floodplain soils commonly have relatively high forest capability and moderate capability for wildlife winter range.

3.4.4. The Upper Kootenay and White River Valleys

The areas considered include the Kootenay River valley above its confluence with the White River and the valleys of the various forks of the White River and its tributaries (Figure 1.1). These valleys are incised into extensive areas of very friable, erodable phyllitic bedrock (Figure 1.3) whose rapid weathering has resulted in a generally subdued, hummocky or level topography on the valley floors (Figure 3.5). The valleys are generally flanked by steep walled, limestone-dolomite peaks, the surficial deposits and soils of which have been discussed previously.

Morainal deposits are generally relatively coarse fragment free and contain a high proportion of silt. The silt is relatively noncohesive and when subjected to loading is prone to structure deformation, collapse and flow. Even in areas of subdued relief, soils developed in these silty morainal surficial materials (Cedrus, Moscliffe and Melbert soil associations) have moderate constraints for settlement and recreational development, and forest management activities. However, agricultural capability and forest productivity values may be fairly high due to favourable topography, lack of coarse fragments and favourable soil moisture retention properties.

Deep colluvium derived from phyllitic bedrock is characterized by relatively gentle slopes (commonly less than 50%), relatively low coarse fragment contents and frequent evidence of surface erosion, gullying and mass movement. Soils developed in these materials (Cochras, Courcelette and Connor soil associations) have severe constraints for settlement and recreational development, and forest management. Agricultural capability is low due to the relatively steep slopes and dissected topography, but forest capability is quite high, a reflection of favourable soil moisture retention and the relatively common occurrence of seepage.

Soil weathered from phyllitic colluvial veneers (River Run, Russette and Rocky Ridge soil associations) (Figure 3.5) are even more fragile and severely limited for both intensive and extensive land uses than are soils developed in deep deposits of phyllitic colluvium. These soils still have, however, fairly high forestry capabilities since tree roots readily penetrate the underlying friable, platy phyllitic bedrock.

Weathering and erosion of phyllite along the margins of valleys has resulted in relatively shallow fans of silty, largely coarse-fragment-free materials capping gravelly fluvioglacial terraces and fans. Soil developed in these materials (Madias, Fenwick and George soil associations) are fragile if subject to loading or disturbance, especially when wet. Despite almost level topography, these soils have moderate constraints for settlement and recreational development, extensive recreational activities, and forest management activities. Agriculture and forest capabilities are relatively high, however, due to favourable topography, lack of coarse fragments, favourable soil moisture retention and relatively common subsoil seepage.

Floodplain soils developed in surficial materials primarily derived from phyllitic bedrock (Fadeway and Fire Mountain soil associations) have severe constraints for most land uses as they are subject to high water tables, inundation and restricted soil drainage.

3.4.5 The Purcell Mountains

The topography of the Purcell Mountains (Figure 1.2) in the project area is more subdued than that of most of the Rocky Mountains. Intermountain valleys tend to be large and occupied by streams and rivers with relatively gentle gradients. Valley floors have relatively large floodplains, generally flanked by extensive areas of gravelly fluvioglacial terraces and fans and, occasionally, by dissected glaciolacustrine terraces (Figure 3.6). Areas of silty sandy, or silty clayey morainal materials are common on valley floors and lower mountain sides. Deep colluvium is also common on lower slopes while shallow colluvial veneers are usual on the upper slopes. Exposed bedrock is less common than in the Rockies and surficial materials are usually noncalcareous.

In the Purcell Mountains, the morainal surficial materials are commonly blanketed over irregular, hummocky bedrock surfaces with slopes of 25 to 70% being common. Soils weathered from silt or silt-clay rich morainal materials (Malpass, Skelly, Shields and Sandon soil associations) generally have moderate constraints for settlement and recreational development and forest management activities. The Sentinel (SL) soil association, developed in sandier morainal materials, is less susceptible to surface erosion and mass movement, and is less severely constrained for intensive or extensive land uses. Agricultural capability is low for soils derived from morainal materials, due primarily to steep topography, but forest capability is relatively high, especially in the Interior Wet Belt (Figure 1.4). Wildlife capability is limited to medium value summer range on most Purcell Mountain soils due to relatively dense forest stands that cover nearly all slopes and valleys.

Soils developed in deep deposits of rubbly coluvium in the Purcells (Cold Creek, cayuse, Calamity, Champion, Cooper and Clifty soil associations) generally have severe constraints for settlement and recreational development, forest management activities and agriculture. Slopes are commonly greater than 60%, coarse fragment contents are high, and hazards from surface erosion or mass movement are moderate. On seepage receiving, lower slopes and in the Interior Wet Belt, forest prodcivity is high.

Soils developed in colluvial veneers (Ryanier, Burtontown, Bohan Creek, Bonner, Buhl Creek and Beatrice soil associations) (Figure 3.6) are severely constrained for either intensive or extensive land uses. They are shallow to bedrock, have steep slopes and high coarse fragment contents and have moderate surface erosion and mass movement hazards. Forests grow more slowly than on deep colluvial soils because of less favourable soil moisture retention properties.

Gravelly fluvioglacial and fluvial fans and terraces in the Purcells usually have relatively flat or subdued topography on their surfaces, with steep, unstable escarpments and steep, eroded gullies. The silty to sandy eolian or fluvial cappings which are common on these materials in the Rocky Mountains, are less prevalent in the Purcells. Soils developed on these deposits (Glen Cairn, Kinert, Glenlily, Kaslo, Fletcher and Fruitvale soil associations) contain considerable coarse fragments and generally are too coarse textured to have high agricultural capability values or to be well suited for septic tank drainage fields. Forest capability and wildlife summer range values are also relatively low, due primarily to the soil droughtiness. Except along gullies and escarpments, these soils have few constraints limiting settlement development.

Soils developed on floodplains in the Purcells (Avis soil association) have severe constraints for settlement and recreational development, and agriculture, primarily because they are frequently inundated. Less intensive activities such as forest management or extensive recreational activities, are less constrained, if limited to non-flood periods. Forest capability and wildlife capability for winter range are relatively high, except on poorly to very poorly drained areas.

Soils developed on organic fens and bogs (Odlumby, Olivia, Olsonite, and O-Neill soil associations), are relatively limited in extent in the East Kootenays. Because of very poor drainage and very low bearing capabilities these soils have severe constraints for any intensive or extensive land uses. An exception is that they often have significant value as wildlife winter range.

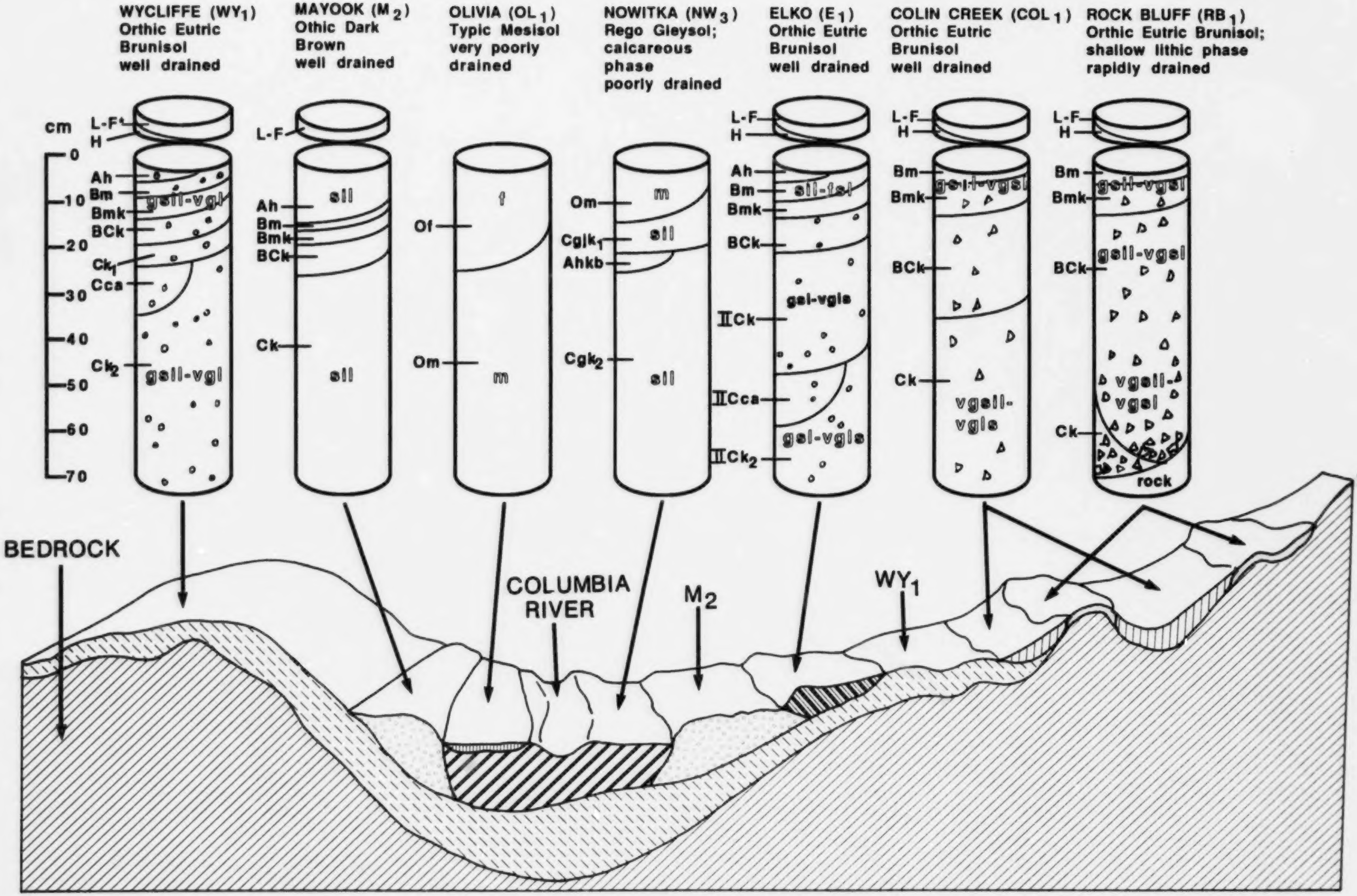

WYCLIFFE (WY1)
Orthic Eutric
Brunisol
well drained
MAYOOK (M 2)
Othic Dark
Brown
well drained
OLIVIA (OL 1)
Typic Mesisol
very poorly
drained
NOWITKA (NW 3)
Rego Gleysol;
calcareous
phase
poorly drained
ELKO (E 1)
Orthic Eutric
Brunisol
well drained
COLIN CREEK (COL 1)
Orthic Eutric
Brunisol
well drained
ROCK BLUFF (RB 1)
Orthic Eutric Brunisol;
shallow lithic phase
rapidly drained
cm
0
10
20
30
40
50
60
70
L-F*
H
Ah
Bm
Bmk
BCk
Ck1
Cca
Ck2
gsil-vgl
gsil-vgl
L-F
Ah
Bm
Bmk
BCk
Ck
sil
sil
Of
Om
f
m
Om
Cgjk1
Ahkb
Cgk2
m
sil
sil
L-F
H
Ah
Bm
Bmk
BCk
IICk
IICca
IICk2
sil-fsl
gsl-vgls
gsl-vgls
L-F
H
Bm
Bmk
BCk
Ck
gsil-vgsl
vgsil-
vgls
L-F
H
Bm
Bmk
BCk
Ck
gsil-vgsl
gsil-vgsl
vgsil-
vgsl
rock
BEDROCK
COLUMBIA
RIVER
M2
WY1

Figure 3.1 Schematic X-section of the Rocky Mountain Trench near Columbia Lake showing the relationship between soil associations in the Interior Rocky Mountain Douglas-fir Forest Zone (see Table 2.1). *Soil horizon symbols as in CSSC, 1978.

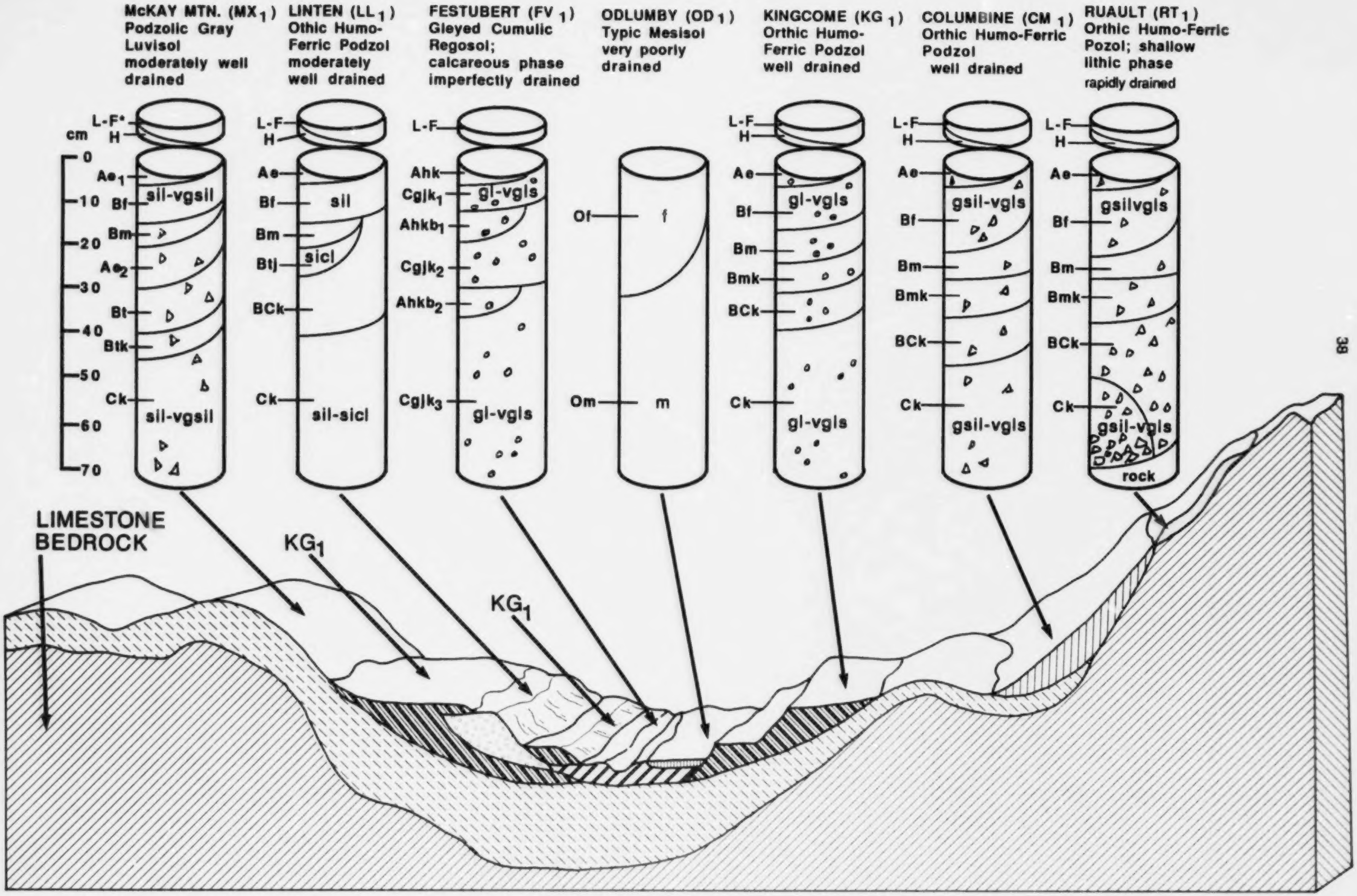

McKAY MTN. (MX1) Podzolic Gray Luvisol moderately well drained
LINTEN (LL1) Othic Humo-Ferric Podzol moderately well drained
FESTUBERT (FV1) Gleyed Cumulic Regosol; calcareous phase imperfectly drained
ODLUMBY (OD1) Typic Mesisol very poorly drained
KINGCOME (KG1) Orthic Humo-Ferric Podzol well drained
COLUMBINE (CM1) Orthic Humo-Ferric Podzol well drained
RUAULT (RT1) Orthic Humo-Ferric Pozol; shallow lithic phase rapidly drained
cm
0
10
20
30
40
50
60
70
L-F*
H
Ae1
Bf
Bm
Ae2
Bt
Btk
Ck
sil-vgsil
sil-vgsil
L-F
H
Ae
Bf
Bm
Btj
BCk
Ck
sil
sicl
sil-sicl
L-F
Ahk
Cgjk1
Ahkb1
Cgjk2
Ahkb2
Cgjk3
gl-vgls
gl-vgls
Of
Om
f
m
L-F
H
Ae
Bf
Bm
Bmk
BCk
Ck
gl-vgls
gl-vgls
L-F
H
Ae
Bf
Bm
Bmk
BCk
Ck
gsil-vgls
gsil-vgls
L-F
H
Ae
Bf
Bm
Bmk
BCk
Ck
gsilvgls
gsil-vgls
rock
LIMESTONE BEDROCK
KG1
KG1

Figure 3.2 Schematic X-section of limestone - dolomite areas in the Rocky Mountains showing the relationships between soil associations in the Subalpine Engelmann spruce - alpine fir Forest Zone (see Table 2.1) *Soil horizon symbols as in CSSC, 1978.

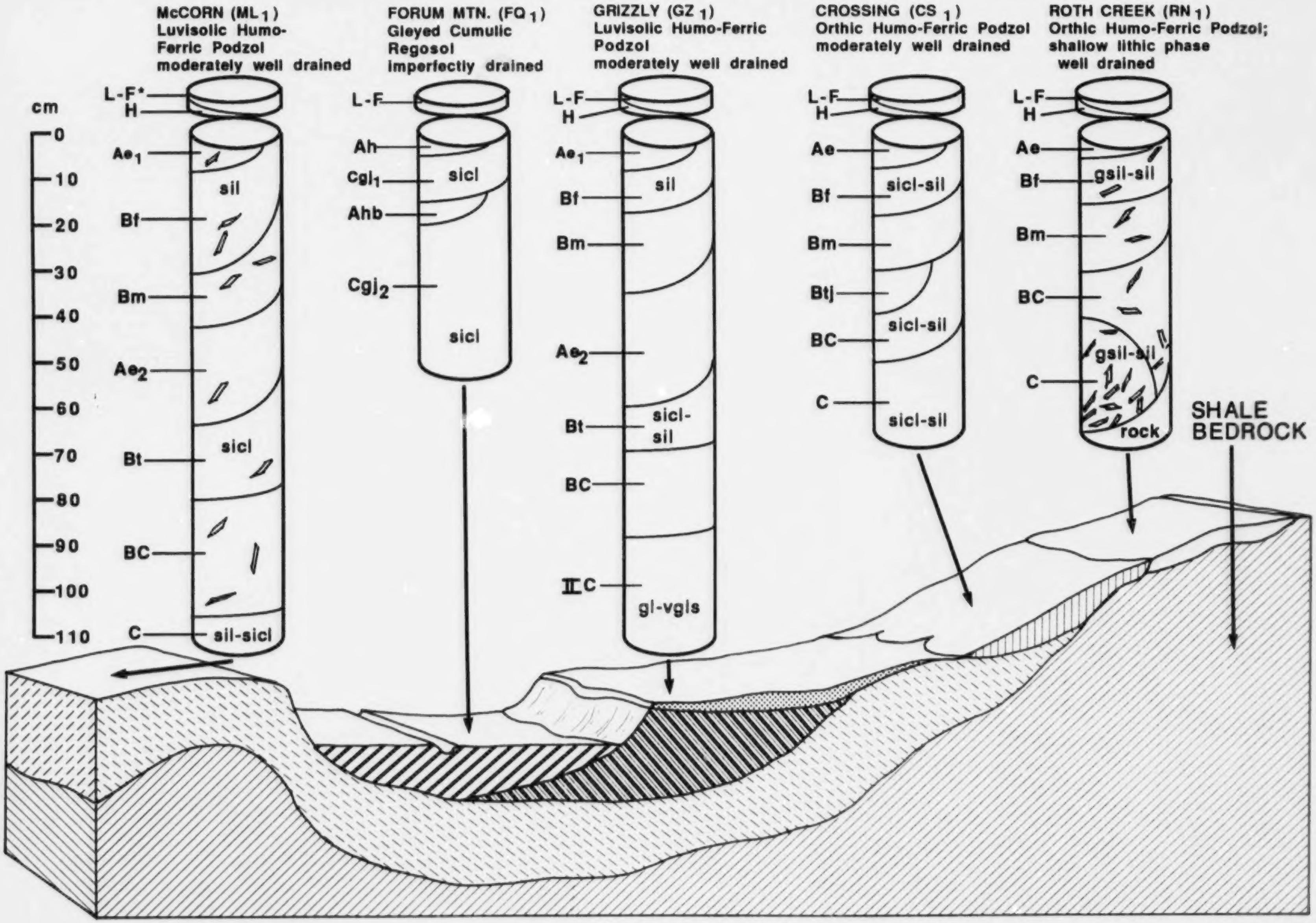

McCORN (ML$_1$)
Luvisolic Humo-Ferric Podzol
moderately well drained
FORUM MTN. (FQ$_1$)
Gleyed Cumulic Regosol
imperfectly drained
GRIZZLY (GZ$_1$)
Luvisolic Humo-Ferric Podzol
moderately well drained
CROSSING (CS$_1$)
Orthic Humo-Ferric Podzol
moderately well drained
ROTH CREEK (RN$_1$)
Orthic Humo-Ferric Podzol;
shallow lithic phase
well drained
cm
0
10
20
30
40
50
60
70
80
90
100
110
L-F*
H
Ae$_1$
Bf
Bm
Ae$_2$
Bt
BC
C
sil
sicl
sil-sicl
L-F
Ah
Cgl$_1$
Ahb
Cgl$_2$
sicl
sicl
L-F
H
Ae$_1$
Bf
Bm
Ae$_2$
Bt
BC
IIC
sil
sicl-sil
gl-vgls
L-F
H
Ae
Bf
Bm
Btj
BC
C
sicl-sil
sicl-sil
sicl-sil
L-F
H
Ae
Bf
Bm
BC
C
gsil-sil
gsil-sil
rock
SHALE BEDROCK

Figure 3.3 Schematic X-section of shale areas in the Rocky Mountains showing the relationship between soil associations in the Subalpine Engelmann spruce-alpine fir Forest Zone (see Table 2.1). *Soil horizon symbols as in CSSC, 1978.

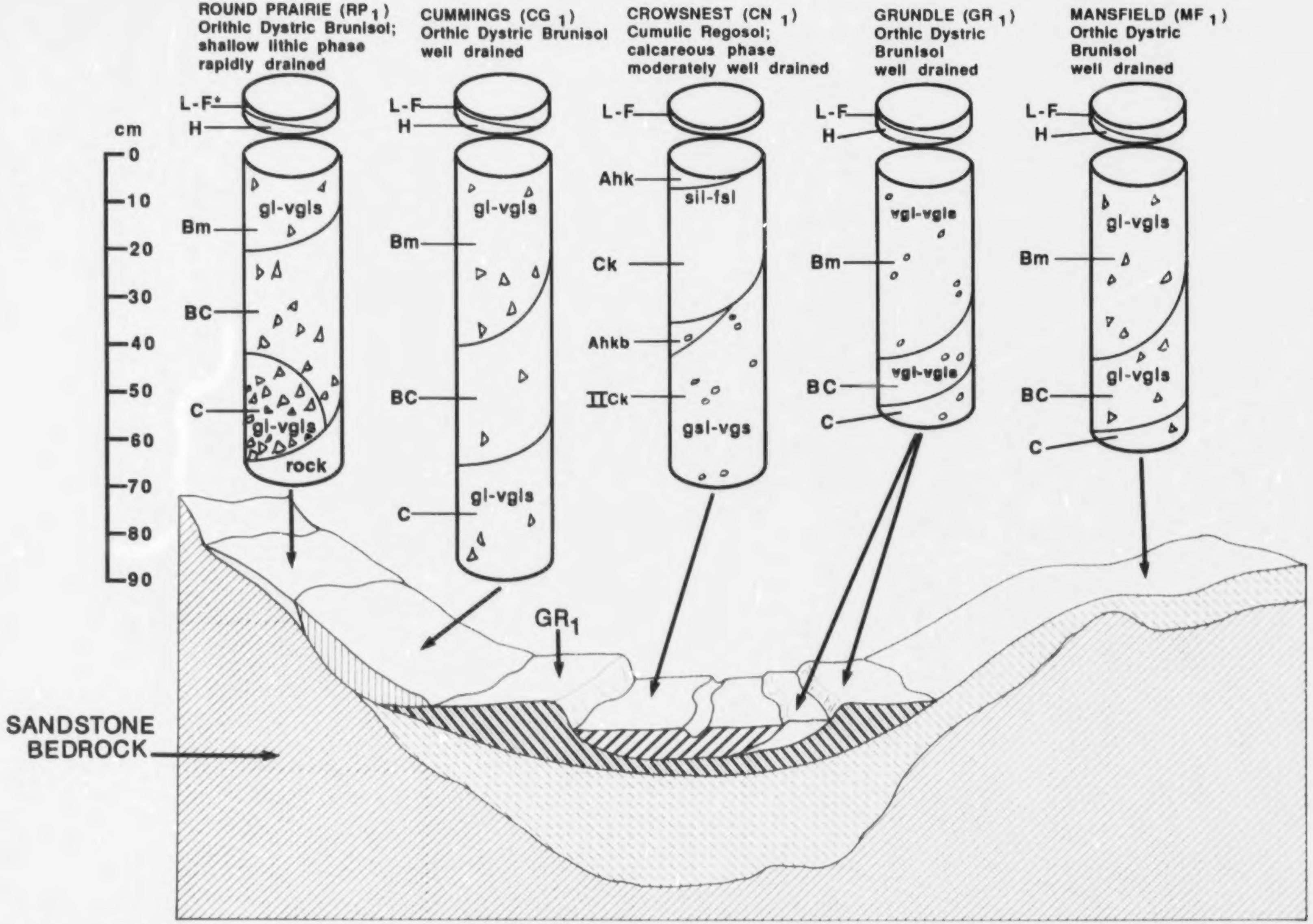

ROUND PRAIRIE (RP 1)
Orithic Dystric Brunisol;
shallow lithic phase
rapidly drained
CUMMINGS (CG 1)
Orthic Dystric Brunisol
well drained
CROWSNEST (CN 1)
Cumulic Regosol;
calcareous phase
moderately well drained
GRUNDLE (GR 1)
Orthic Dystric
Brunisol
well drained
MANSFIELD (MF 1)
Orthic Dystric
Brunisol
well drained
cm
0
10
20
30
40
50
60
70
80
90
L-F*
H
Bm
BC
C
gl-vgls
gl-vgls
rock
L-F
H
Bm
BC
C
gl-vgls
gl-vgls
L-F
Ahk
Ck
Ahkb
IICk
sil-fsl
gsl-vgs
L-F
H
Bm
BC
C
vgl-vgls
vgl-vgls
L-F
H
Bm
BC
C
gl-vgls
gl-vgls
GR1
SANDSTONE
BEDROCK

Figure 3.4 Schematic X-section of sandstone areas in the Rocky Mountains showing the relationship between soil associations in the Rocky Mountain Douglas-fir Forest Zone (see Table 2.1). *Soil horizon symbols as in CSSC, 1978.

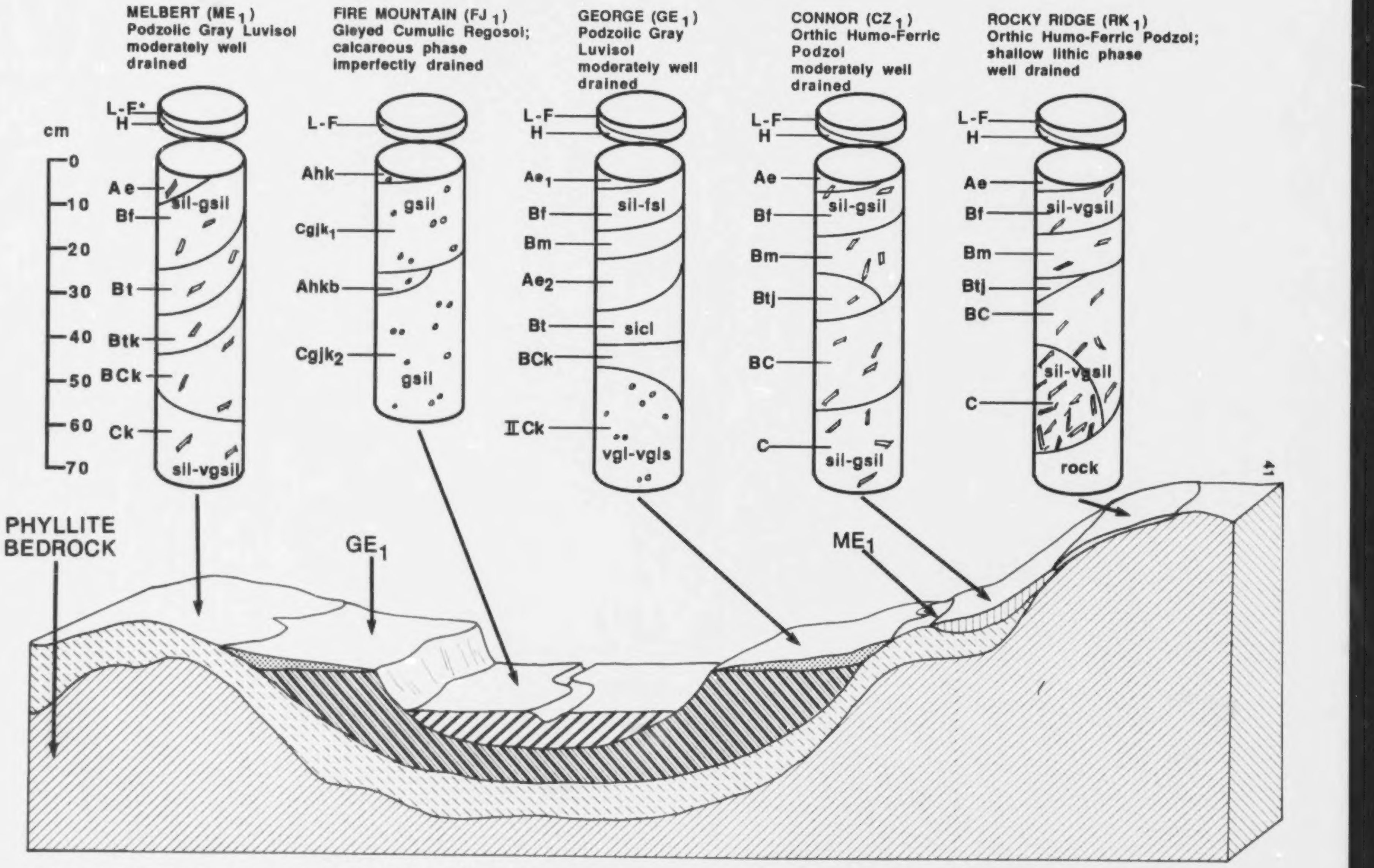

MELBERT (ME 1)
Podzolic Gray Luvisol
moderately well
drained
FIRE MOUNTAIN (FJ 1)
Gleyed Cumulic Regosol;
calcareous phase
imperfectly drained
GEORGE (GE 1)
Podzolic Gray
Luvisol
moderately well
drained
CONNOR (CZ 1)
Orthic Humo-Ferric
Podzol
moderately well
drained
ROCKY RIDGE (RK 1)
Orthic Humo-Ferric Podzol;
shallow lithic phase
well drained
cm
0
10
20
30
40
50
60
70
L-F*
H
Ae
Bf
Bt
Btk
BCk
Ck
sil-gsil
sil-vgsil
L-F
Ahk
Cglk1
Ahkb
Cglk2
gsil
gsil
L-F
H
Ae1
Bf
Bm
Ae2
Bt
BCk
II Ck
sil-fsl
sicl
vgl-vgls
L-F
H
Ae
Bf
Bm
Btj
BC
C
sil-gsil
sil-gsil
L-F
H
Ae
Bf
Bm
Btj
BC
C
sil-vgsil
sil-vgsil
rock
PHYLLITE
BEDROCK
GE1
ME1

Figure 3.5 Schematic X-section of phyllitic bedrock areas in the White and Kootenay River valleys showing the relationship between soil associations in the Subalpine Engelmann spruce-alpine fir Forest Zone (see Table 2.1). * Soil horizon symbols as in CSSC, 1978.

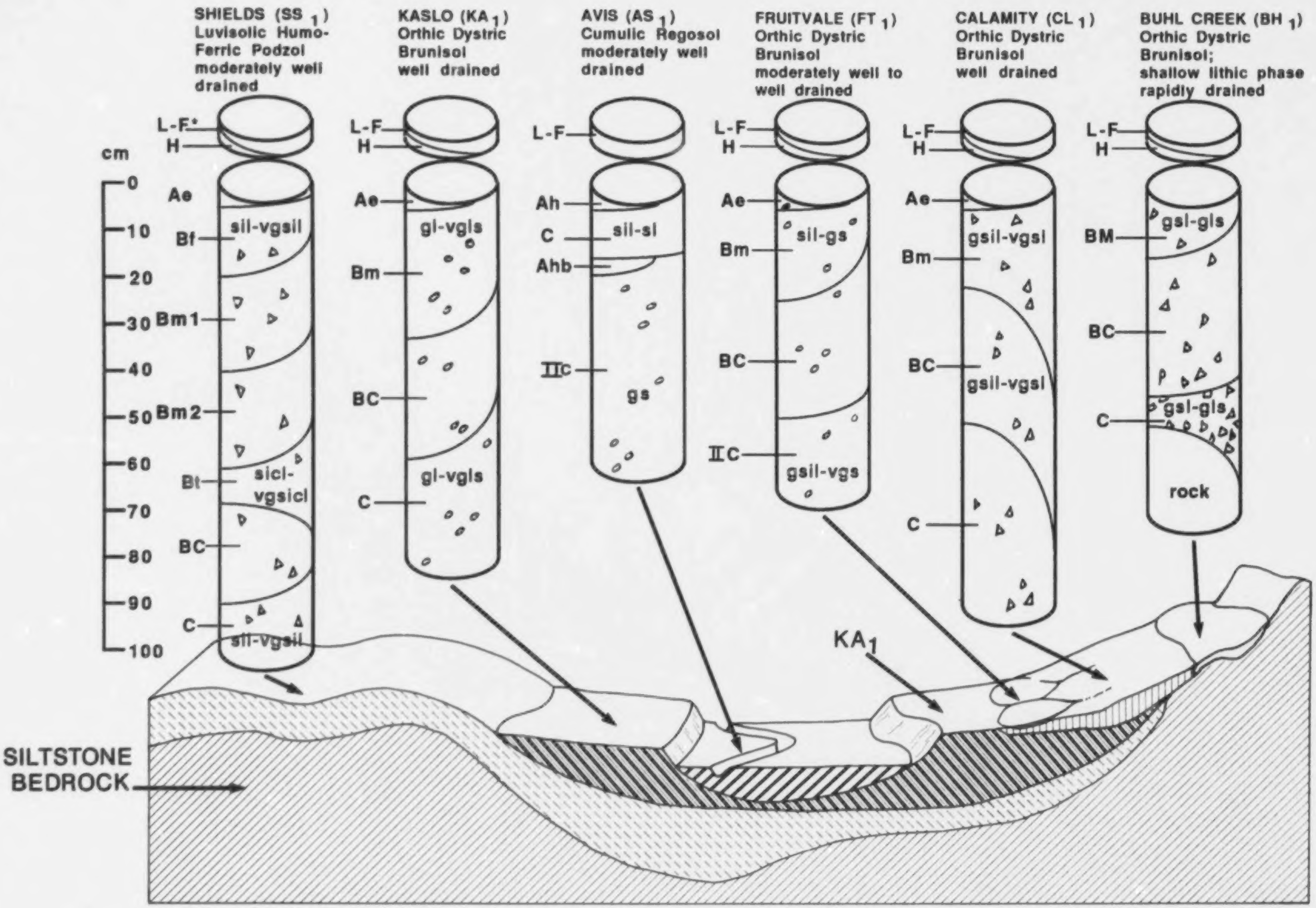

SHIELDS (SS 1)
Luvisolic Humo-Ferric Podzol
moderately well drained
KASLO (KA 1)
Orthic Dystric Brunisol
well drained
AVIS (AS 1)
Cumulic Regosol
moderately well drained
FRUITVALE (FT 1)
Orthic Dystric Brunisol
moderately well to well drained
CALAMITY (CL 1)
Orthic Dystric Brunisol
well drained
BUHL CREEK (BH 1)
Orthic Dystric Brunisol;
shallow lithic phase
rapidly drained
cm
0
10
20
30
40
50
60
70
80
90
100
L-F*
H
Ae
Bf
Bm1
Bm2
Bt
BC
C
sil-vgsil
sicl-vgsicl
sil-vgsil
L-F
H
Ae
Bm
BC
C
gl-vgls
gl-vgls
L-F
Ah
C
Ahb
IIc
sil-sl
gs
L-F
H
Ae
Bm
BC
IIC
sil-gs
gsil-vgs
L-F
H
Ae
Bm
BC
C
gsil-vgsl
gsil-vgsl
L-F
H
BM
BC
C
gsl-gls
gsl-gls
rock
KA1
SILTSTONE BEDROCK

Figure 3.6 Schematic X-section of the Purcell Mountains showing the relationship between soil associations in the Interior western hemlock-western red cedar Forest Zone (see Table 2.1).

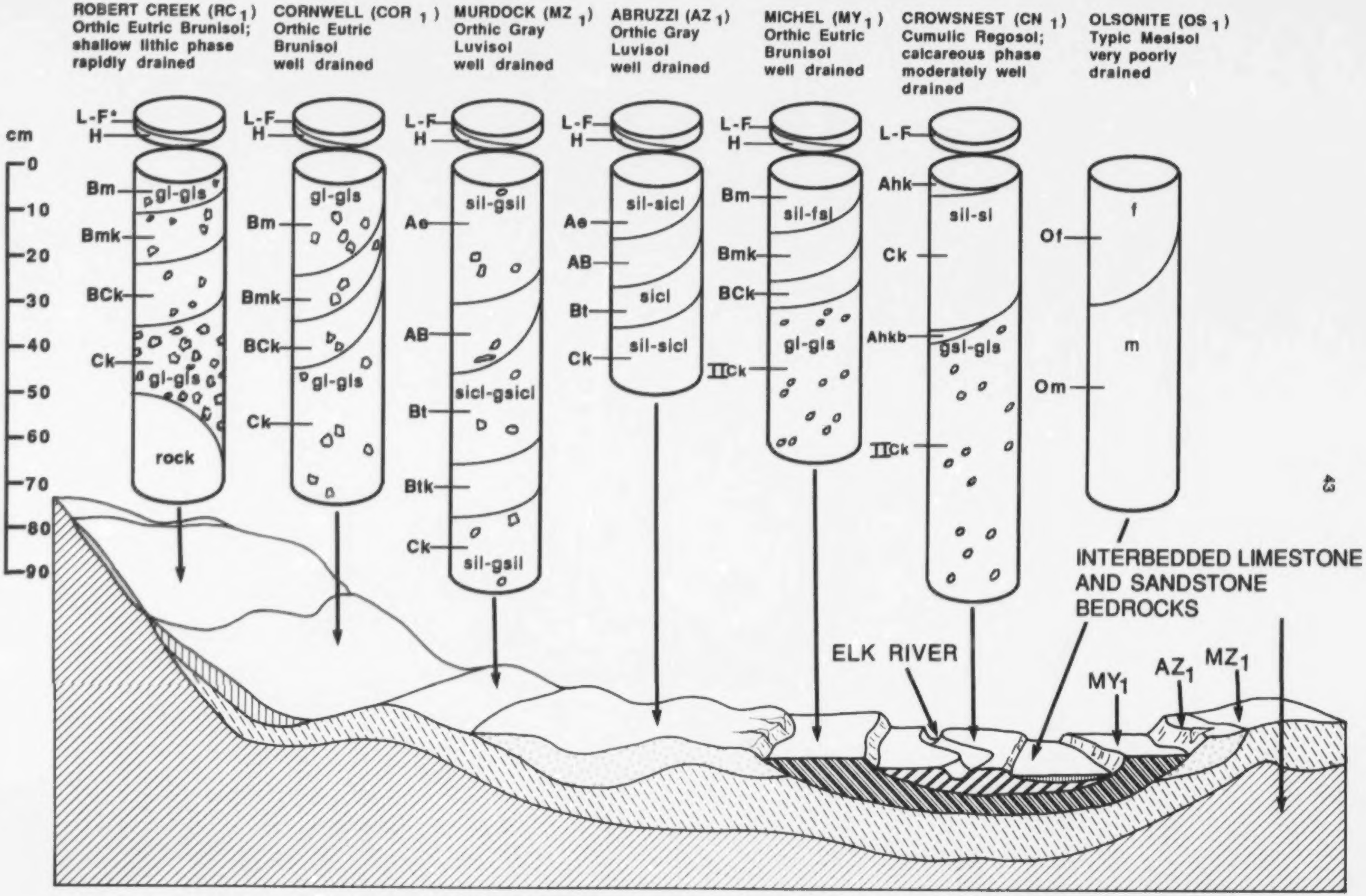

ROBERT CREEK (RC_1)
Orthic Eutric Brunisol;
shallow lithic phase
rapidly drained
CORNWELL (COR_1)
Orthic Eutric
Brunisol
well drained
MURDOCK (MZ_1)
Orthic Gray
Luvisol
well drained
ABRUZZI (AZ_1)
Orthic Gray
Luvisol
well drained
MICHEL (MY_1)
Orthic Eutric
Brunisol
well drained
CROWSNEST (CN_1)
Cumulic Regosol;
calcareous phase
moderately well
drained
OLSONITE (OS_1)
Typic Mesisol
very poorly
drained
cm
0
10
20
30
40
50
60
70
80
90
L-F*
H
Bm
Bmk
BCk
Ck
gl-gls
gl-gls
rock
L-F
H
Bm
Bmk
BCk
Ck
gl-gls
gl-gls
L-F
H
Ae
AB
Bt
Btk
Ck
sil-gsil
sicl-gsicl
sil-gsil
L-F
H
Ae
AB
Bt
Ck
sil-sicl
sicl
sil-sicl
L-F
H
Bm
Bmk
BCk
IICk
sil-fsl
gl-gls
L-F
Ahk
Ck
Ahkb
IICk
sil-sl
gsl-gls
Of
Om
f
m
INTERBEDDED LIMESTONE
AND SANDSTONE
BEDROCKS
ELK RIVER
MY_1
AZ_1
MZ_1

Figure 3.7 Schematic X-section of the Elk River valley, near Sparwood, showing the relationship between soil associations in the Rocky Mountain Douglas-fir Forest Zone (see Table 2.1). * Soil horizon symbols as in CSSC, 1978.

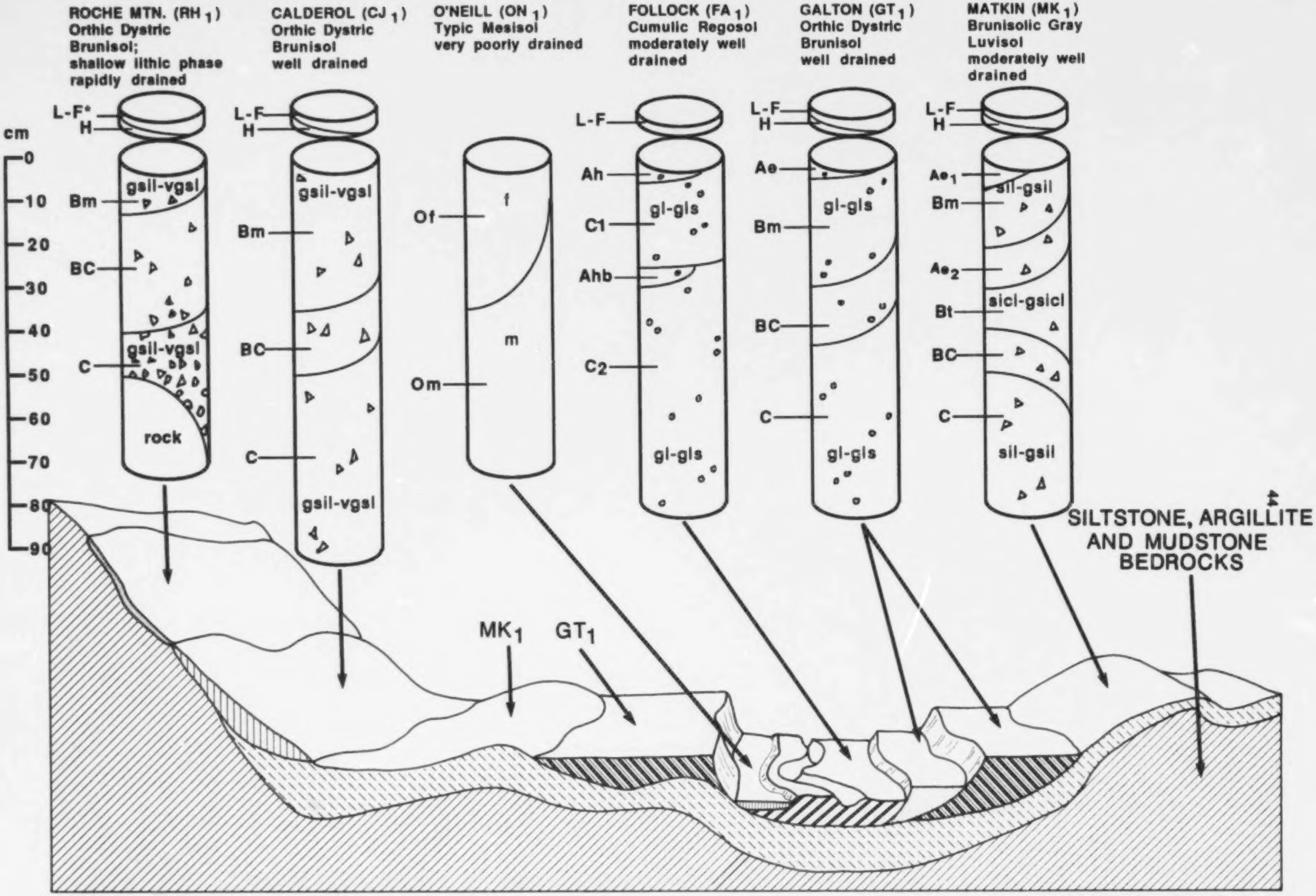

ROCHE MTN. (RH 1)
Orthic Dystric
Brunisol;
shallow lithic phase
rapidly drained
CALDEROL (CJ 1)
Orthic Dystric
Brunisol
well drained
O'NEILL (ON 1)
Typic Mesisol
very poorly drained
FOLLOCK (FA 1)
Cumulic Regosol
moderately well
drained
GALTON (GT 1)
Orthic Dystric
Brunisol
well drained
MATKIN (MK 1)
Brunisolic Gray
Luvisol
moderately well
drained
cm
0
10
20
30
40
50
60
70
80
90
L-F*
H
Bm
BC
C
gsil-vgsl
gsil-vgsl
rock
L-F
H
Bm
BC
C
gsil-vgsl
gsil-vgsl
Of
Om
f
m
L-F
Ah
C1
Ahb
C2
gl-gls
gl-gls
L-F
H
Ae
Bm
BC
C
gl-gls
gl-gls
L-F
H
Ae1
Bm
Ae2
Bt
BC
C
sil-gsil
sicl-gsicl
sil-gsil
MK1
GT1
SILTSTONE, ARGILLITE
AND MUDSTONE
BEDROCKS

Figure 3.8 Schematic X-section of the Flathead Basin showing the relationship between soil associations in the Subalpine Engelmann spruce-alpine fir Forest Zone (see Table 2.1). * Soil horizon symbols as in CssC, 1978.
]

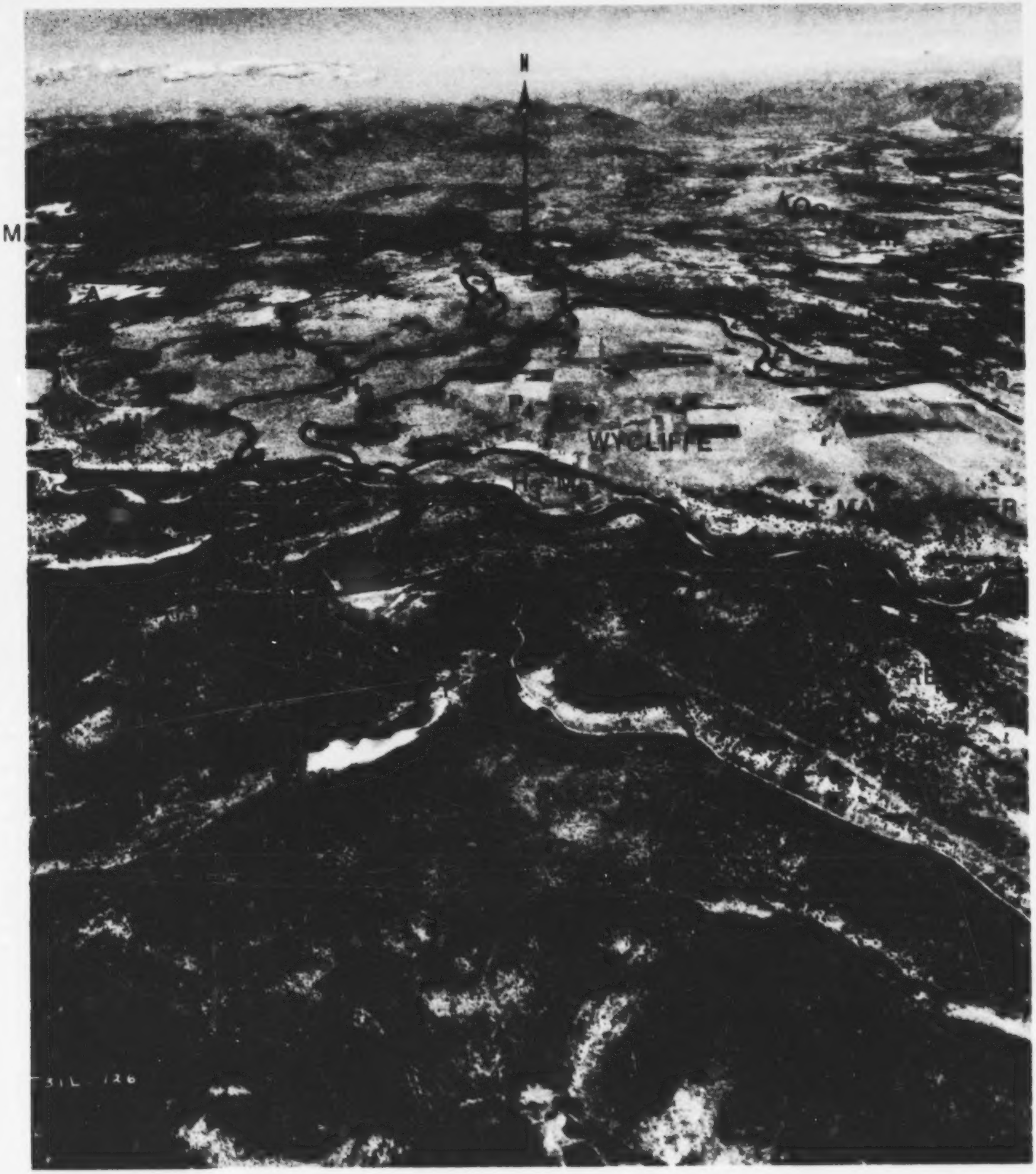

N
WYCLIFFE
31L 126

Plate 3.1. Soils on the floor of the Rocky Mountain Trench at St. Mary's Prairie

RA7–RO
FS
RIVER
$5A_3$–E_2
577·77

Plate 3.2. Soils on the floor of the Rocky Mountain Trench at Premier Lake

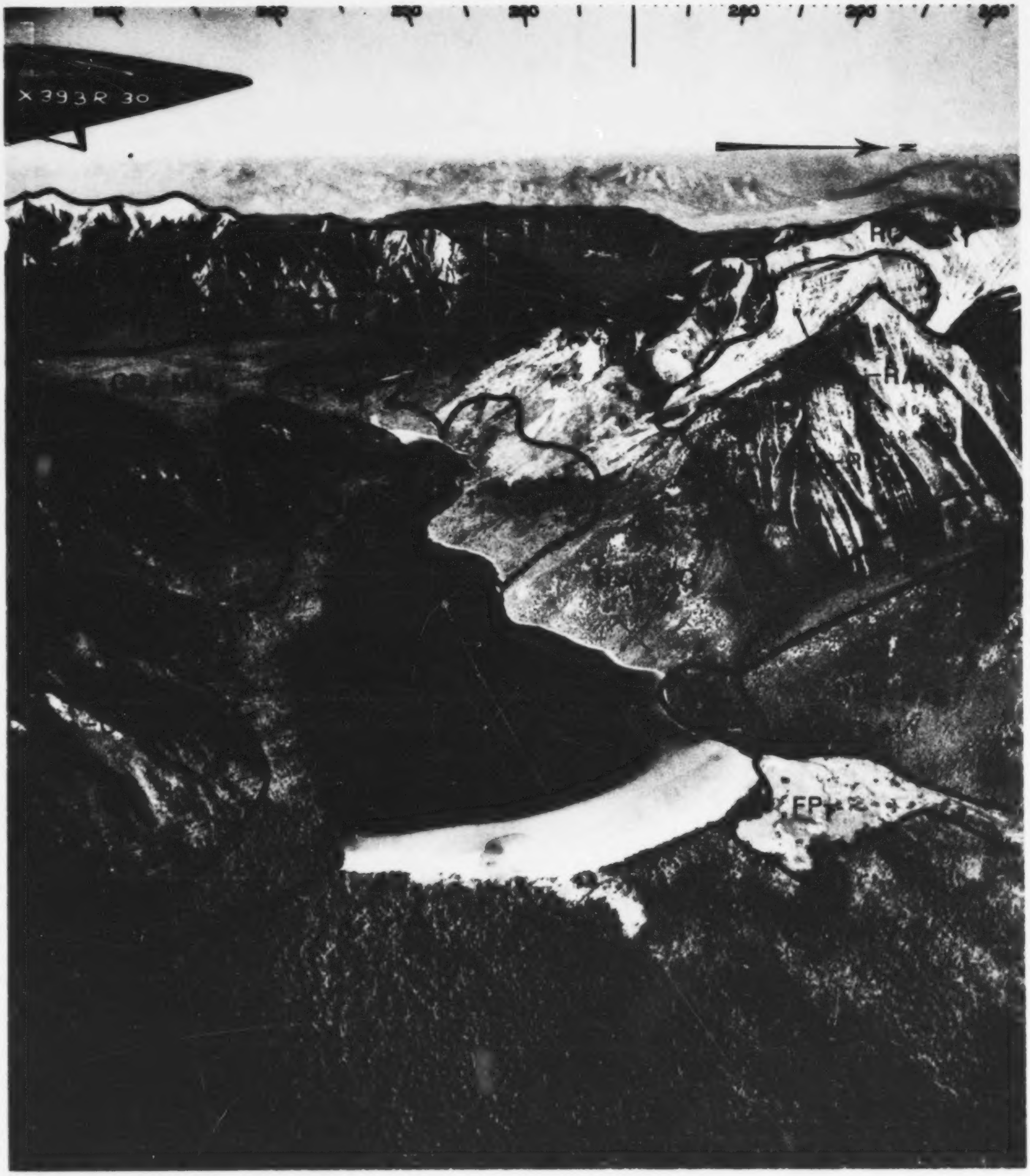

X393R 30
RD
RA
R
FP

Plate 3.3. Soils in the Whiteswan Lake area

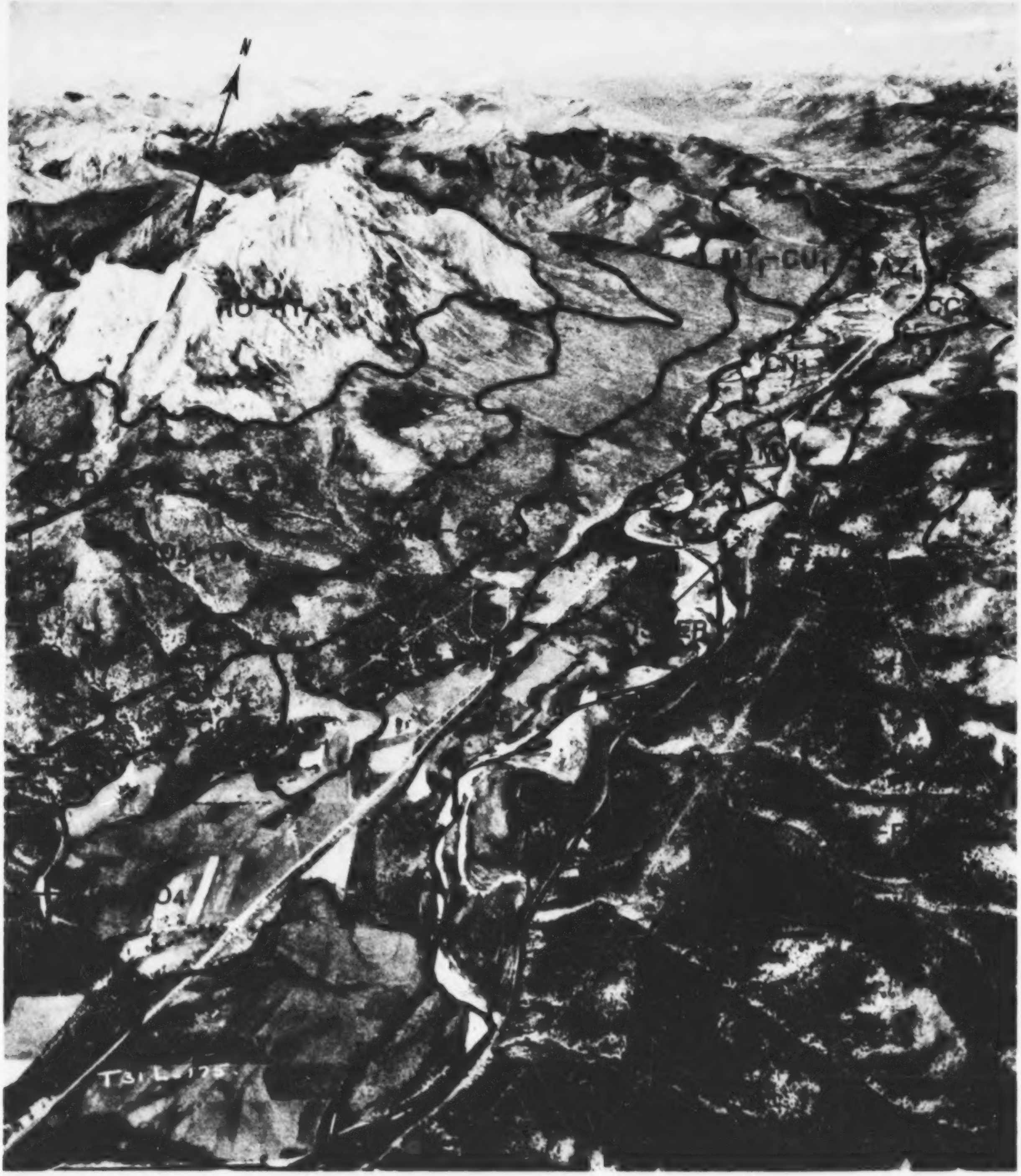

N
CU1
AZ1
CC
CN1
MO
ER
O4
T31 L-175

Plate 3.4. Soils in the Elk River Valley at Hosmer

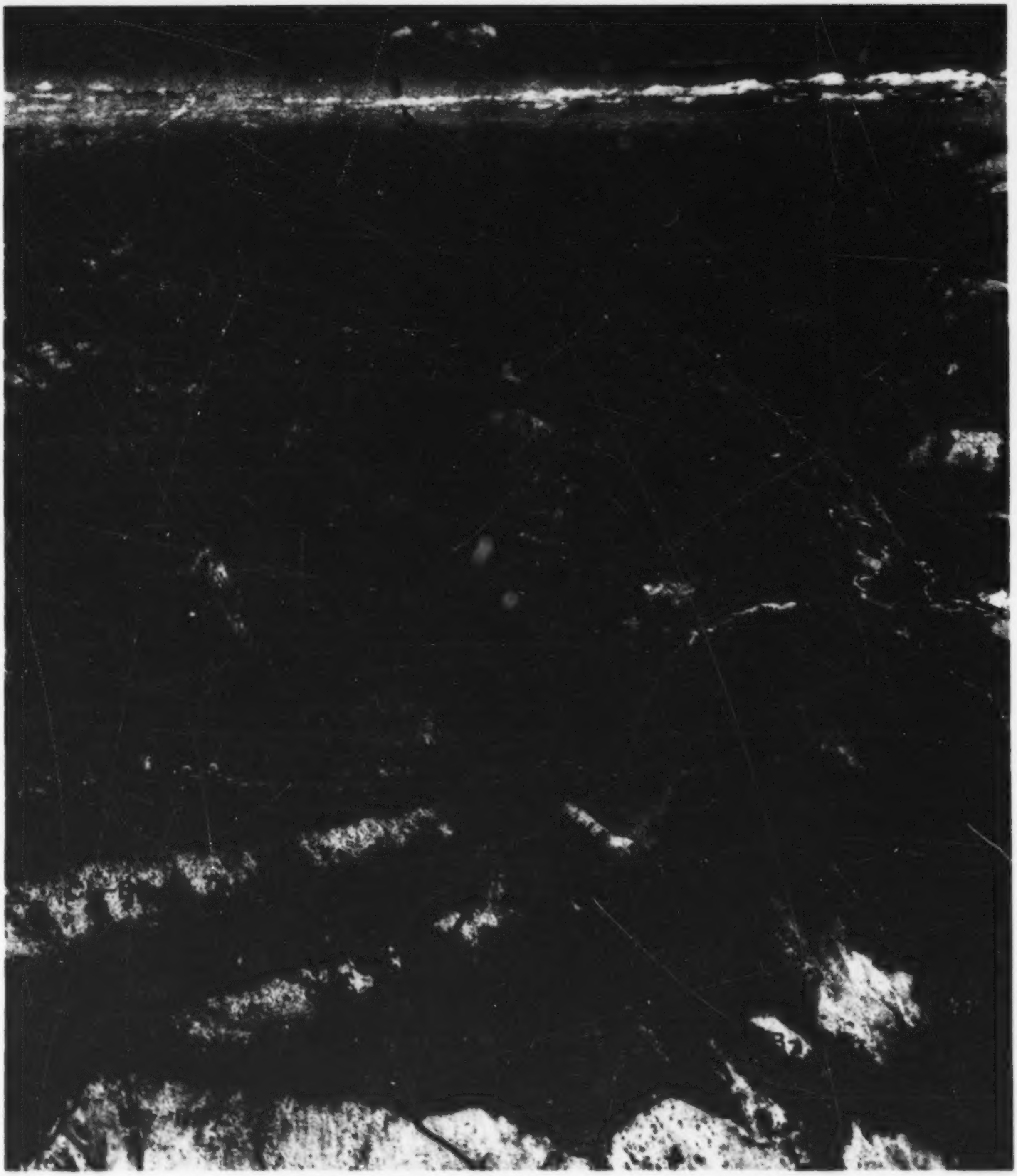


Plate 3.5. Soils in the Fernie Basin, vicinity of Michel Creek

Plate 3.6. Soils in the White River Valley, near Colin Creek

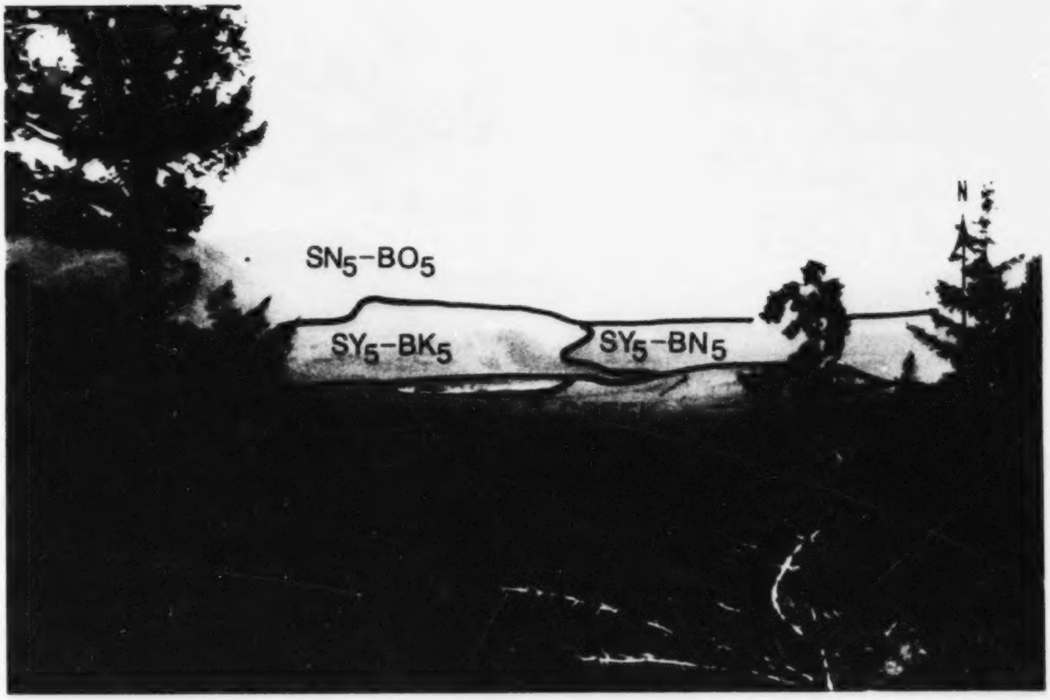

SN_5-BO_5
SY_5-BK_5
SY_5-BN_5
N

Plate 3.7. Soils in the Gold Creek area, Purcell Mountains

CHAPTER FOUR

DESCRIPTION OF THE SOIL ASSOCIATIONS

Chapter Four describes of the 138 biophysical soil associations identified and mapped in the East Kootenay project area.

4.1 PARAMETERS DESCRIBED FOR EACH SOIL ASSOCIATION

The soil associations are arranged in alphabetical order by soil association name.

Described for each association are physiographic region(s), and Forest Zone and Subzone in which it occurs. Also given is the surficial material in which the soil association has developed and the associated bedrock group. The topography (slope) of the association and its elevational range is also indicated.

The soil association is more specifically described with regard to soil drainage, perviousness and texture, and coarse fragment content. The most common soil in the association is also described in terms of soil profile characteristics (i.e. horizons and thickness, color, structure and consistence, reaction and calcareousness). Also given is the most common taxonomic classification.

The soil association components are also indicated and described in terms of most, and less common soil(s), their taxonomic classification and soil drainage. Also given are comments which indicate how, and why, the components differ from the most common soil.

The availability in the B.C. Soil Information System of detailed soil profile descriptions, with chemical and physical analysis, is also indicated.

4.2 DETAILED SOIL ASSOCIATION DESCRIPTIONS

Description of the individual soil associations follow.

* ABRUZZI Soil Association - AZ

Abruzzi soils occur in the Rocky Mountain Trench and on the floors of larger valleys in the Purcell and Rocky mountains under open forest within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty glaciolacustrine terraces and plains where the materials are usually deep, but in a few places may be as shallow as 50 cm over till (Figure 3.7; Plates 3.1, 3.4). Slopes range between 5 and 30%, although escarpments and gully walls are much steeper. Elevations range between 1050 and 1350 m asl.

Abruzzi soils are generally well drained and slowly to moderately pervious. Texture is most commonly silt loam, but may range to silty clay loam. Coarse fragments are usually not present. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface and overlies a 5 to 10 cm thick, very pale brown (dry), very strongly to strongly acid, friable, leached mineral horizon (Ae). It, in turn, is underlain by a 10 to 15 cm thick clay accumulation zone (Bt) which is very pale brown to light yellowish brown (dry), and strong angular blocky. Neutral to mildly alkaline subsoil horizons resembling the clay accumulation horizon (Btk, BCk, Ck) occur at depths below 15 to 25 cm. The usual classification is **Orthic Gray Luvisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
AZ1	Orthic Gray Luvisol	well			Consists dominantly of the most common soil as described above.
AZ2	Orthic Gray Luvisol	well	Orthic Eutric Brunisol	well	Less common soil lacks a well developed clay accumulation horizon. It has a light yellowish to yellowish-brown, slightly acid, less intensely leached and weathered solum due to its occurrence in climatically or edaphically drier locations. It is equivalent to the Mayook 1 soil association component.
AZ3	Orthic Gray Luvisol	well	Brunisolic Gray Luvisol	well to moderately well	Less common soil has a light yellowish brown, surface horizon (Bm) over a clay accumulation horizon. It occurs in climatically or edaphically wetter locations and is equivalent to the Lancaster 1 soil association component.
AZ7	Orthic Gray Luvisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance and/or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* AVIS Soil Association - AS

Avis soils occur in the Purcell Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in silty sandy fluvial veneers overlying gravelly floodplain deposits derived from primarily non-calcareous bedrocks (Figure 3.6). Slopes are usually <2% and elevations range between 1200 and 1300 m asl.

Avis soils are dominantly moderately well to imperfectly drained. Silt loam or sandy loam (most common) is the usual texture in the upper horizons, while subsoil horizons are gravelly or very gravelly sand. Coarse fragment content generally varies from <20% in the surface to 70% in the subsoil. Thin layers and lenses of varying textures, often organic matter enriched, are common throughout the solum. The usual solum colour is dark grayish brown and mottles, when present, usually occur at depths below 50 cm and are dark yellowish brown.

Avis soils are young and mostly have either weak or no soil development due to periodic flooding and surface additions of fresh mineral material. A rhizomull layer up to 4 cm thick consisting of plant litter and a thin, organic matter enriched mineral horizon (Ah), is usually present at the soil surface. These overlie very strongly to strongly acid parent material (C). The usual classification is **Cumulic Regosol,** although Orthic Regosol is also common.

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
AS1	Cumulic Regosol	moderately well			Consists dominantly of the most common soil as described above.
AS3	Cumulic Regosol	moderately well	Gleyed Cumulic Regosol, Rego Gleysol	imperfect to poor	Less common soils have gleyed horizons (Cgj, Cg) and a few have peaty surfaces <40 cm thick (Of, Om). They occupy the lower lying positions in the floodplain landscape.
AS9	Cumulic Regosol	moderately well	Orthic Dystric Brunisol	well to rapid	Less common soil occupies higher lying, small, rarely flooded terraces and fans. It has a light yellowish brown solum (Bm) and is equivalent to the most common soil in the Glenlily Soil Association.
AS10	Cumulic Regosol	moderately well	Orthic Humo-Ferric Podzol	well to rapid	Less common soil occupies the highest lying, small, rarely flooded terraces and fans. The solum is strong brown in colour and strongly podzolized (Bf).

* AVIS Soil Association - AS (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
AS11	Gleyed Cumulic Regosol, Rego Gleysol	imperfect to poor	Cumulic Regosol	moderately well	Most common soils have gleyed horizons (Cgj, Cg) and a few may have peaty surfaces <40 cm thick (Of, Om). They occupy the lower lying positions in the floodplain landscape. The less common soil is as described for Avis soils.
AS12	Rego Gleysol, Terric Mesisol	poor to very poor	Cumulic Regosol	moderately well	Most common soils may have peaty surfaces up to 160 cm thick (Om). They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Avis soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* BADSHOT Soil Association - BS

Badshot soils occur in both the Rocky and Purcell mountains, within the Rocky Mountain Douglas-fir lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial materials usually <1 m in depth and derived from a variety of calcareous bedrocks (Plates 3.3, 4.5, 4.19). Slopes are generally well in excess of 30% and elevations range from 1350 and 1800 m asl.

Badshot soils are generally rapidly drained and rapidly pervious. Textures range between gravelly silt loam and very gravelly loamy sand, although very gravelly silt loam is most common. Coarse fragment contents vary between 30 and 80% and consist mainly of angular gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. It overlies a 10 to 30 cm thick, light yellowish brown to yellowish-brown (dry), slightly acid to mildly alkaline horizon (Bm) which grades (Bmk, BCk) to mildly or moderately alkaline, carbonate enriched subsoil horizons (Ck, Cca) at about 35 cm depth. These are characterized by whitish accumulations of carbonates on the undersides of coarse fragments. Bedrock usually occurs at depths between 50 and 100 cm. The usual classification is **Orthic Eutric Brunisol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BS1	Orthic Eutric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
BS2	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Melanic Brunisol; shallow lithic phase, Orthic Eutric Brunisol; calcareous, shallow lithic phase	rapid	Less common soils may have a well developed, organic matter enriched surface horizon (Ah), or may be calcareous to the surface, due to occurrence in climatically or edaphically drier locations dominated by grassy vegetation.
BS3	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Less common soil has a deeper, dark yellowish brown, very strongly to strongly acid upper horizon (Bm) due to occurrence in climatically or edaphically wetter locations, or less calcareous parent material.
BS4	Orthic Eutric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase	rapid	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer soil textures.

* BADSHOT Soil Association - BS (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BS5	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
BS6	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Badshot soils.
BS7	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Regosol; calcareous, shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
BS8	Orthic Eutric Brunisol; shallow lithic phase	rapid	Cumulic Humic Regosol; calcareous, shallow lithic phase, Orthic Regosol; calcareous, shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

BEATRICE Soil Association - BC

Beatrice soils occur at the higher elevations in the Purcell Mountains, within the forested subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial materials mostly <1 m thick and derived from medium to coarse grained, non-calcareous bedrocks. The topography is typical of mountain summits; slopes vary from 30 to 100%, while elevations range between 1500 and 2300 m asl.

Beatrice soils are mostly rapidly drained and rapidly pervious. Textures range from gravelly sandy loam (most common) to very gravelly loamy sand. Between 20 and 90% coarse fragments occur and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, grayish, leached horizon (Ae) which is underlain by a 40 to 60 cm thick, yellowish-brown (dry), extremely to strongly acid, podzolized horizon (Bf). The Bf horizon then grades (Bm, BC) to relatively unweathered, moderately to slightly acid parent material (C). Bedrock is encountered at depths between 50 and 100 cm. The usual classification is **Orthic Humo-Ferric Podzol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BC1	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
BC2	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically drier locations and has weakly podzolized (Bm) horizons. It is equivalent to the Buhl Creek 1 soil association component.
BC3	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Ferro-Humic Podzol; shallow lithic phase, Sombric Humo-Ferric Podzol; shallow lithic phase	moderately well to well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
BC5	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
BC6	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Beatrice soils.

BEATRICE Soil Association - BC (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BC7	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
BC8	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

The Beatrice soil association was not described in detail or sampled for the current study. It was described, sampled and analyzed, however, for the bulletins: Soil Resources of the Nelson Map Area and Soil Resources for the Lardeau Map Area, and that data is available from the B.C. Soil Information System.

* BIG FISH Soil Association - BF

Big Fish soils occur in both the Rocky and Purcell mountains, and in the Rocky Mountain Trench, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in rubbly colluvial materials derived from calcareous bedrocks. The deposits are usually <1 m deep, and on 30 to 100% slopes (Plates 3.1, 3.2). Elevations range between 1050 and 1350 m asl.

Big Fish soils are generally rapidly drained and rapidly pervious. Textures vary widely and range between gravelly silt loam and very gravelly loamy sand; gravelly silt loam is most common, however. Coarse fragment contents vary between 30 and 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface. It overlies a 5 to 10 cm thick, brown (dry), medium acid to neutral horizon (Bm) which grades (Bmk, BCk) to a moderately alkaline, carbonate enriched subsoil (Cca or Ck) at about 25 cm. This subsoil horizon is characterized by carbonate accumulations on the undersides of coarse fragments. Bedrock is usually encountered at depths between 50 to 100 cm. The usual classification is **Orthic Eutric Brunisol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BF1	Orthic Eutric Brunisol; shallow lithic phase	rapid			Consists dominantly of most common soil as described above.
BF2	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Dark Brown; shallow lithic phase, Orthic Eutric Brunisol; calcareous, shallow lithic phase	rapid	Less common soils may have a well developed, organic matter enriched surface horizon (Ah), or may be calcareous to the surface, due to their occurrence in climatically or edaphically drier locations dominated by grassy vegetation.
BF3	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Less common soil has a deeper, dark yellowish brown, extremely to strongly acid upper horizon (Bm) due to its occurrence in climatically or edaphically moisture locations, or has developed on somewhat less calcareous parent materials.
BF4	Orthic Eutric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase, Orthic Gray Luvisol; shallow lithic phase	rapid	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. On drier sites they may lack a Bm horizon.

* BIG FISH Soil Association - BF (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BF5	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
BF6	Orthic Eutric Brunisol; very shallow lithic phase .	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick to over bedrock. Less common soil is as described for Big Fish soils.
BF7	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Regosol; calcareous, shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

BOHAN CREEK Soil Association - BK

Bohan Creek soils occupy limited areas in the Purcell Mountains, within the lodgepole pine - Engelmann spruce - alpine fir subzone of the Interior western hemlock - western red cedar Forest Zone (Plate 3.7). They have developed in rubbly colluvial materials derived from fine to medium grained, non-calcareous bedrocks. The colluvial materials are usually <1 m thick and occur on 30 to 100% slopes. Elevations range from 1350 to 1650 m asl.

Bohan Creek soils are generally rapidly drained and rapidly pervious. Textures range from gravelly silt loam (most common) to very gravelly sandy lom. Coarse fragment contents vary from 25 to 90%, and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and overlies a <5 cm thick, light gray, leached horizon (Ae). The Ae overlies a 20 to 50 cm thick, yellowish-brown (dry), strongly to extremely acid horizon (Bm) which then grades (BC) to relatively unweathered, moderately to slightly acid, parent material (C). Bedrock is encountered at depths between 50 and 100 cm. The usual classification is **Orthic Dystric Brunisol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
BK1	Orthic Dystric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
BK2	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically drier locations, or on somewhat less acidic parent materials. It has shallower, light yellowish brown, medium to slightly acid upper horizons (Bm), and is equivalent to the Ryanier 1 soil association component.
BK3	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically wetter locations. It contains a podzolized, very strongly acid upper horizon (Bf) and is equivalent to the Bonner 1 soil association component.
BK4	Orthic Dystric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase	rapid	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.

BOHAN CREEK Soil Association - BK (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BK5	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
BK6	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Bohan Creek soils.
BK7	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
BK8	Orthic Dystric Brunisol; shallow lithic phase	rapid	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur in avalanche tracks and run-out zones. They may contain organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Bohan Creek soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Bonner soil association.

* BONNER Soil Association - BO

Bonner soils occupy limited areas at higher elevations in the Purcell Mountains within the forested subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial materials which are mostly <1 m thick and derived from medium grained, non-calcareous bedrocks (Plate 3.7). Topography is typical of mountain summits with slopes ranging from 30 to 100%. Elevations vary between 1500 and 2300 m asl.

Bonner soils are generally rapidly drained and rapidly pervious. Textures vary from gravelly silt loam (most common) to very gravelly sandy loam, while coarse fragment contents range between 25 and 90% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, light gray, leached horizon (Ae) which, in turn, overlies a 20 to 40 cm thick, yellowish-brown (dry), extremely to very strongly acid, podzolized horizon (Bf). This horizon then grades (Bm, BC) to relatively unweathered, moderately to slightly acid parent material (C) at about 50 cm depth. Bedrock is encountered at depths between 50 and 100 cm. The usual classification is **Orthic Humo-Ferric Podzol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BO1	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
BO2	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically drier locations and has a less brunisolic upper horizon (Bm). It is equivalent to Bohan Creek 1 soil association component.
BO3	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Ferro-Humic Podzol; shallow lithic phase, Sombric Humo-Ferric Podzol; shallow lithic phase	moderately well to well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
BO4	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Podzolic Gray Luvisol; shallow lithic phase, Luvisolic Humo-Ferric Podzol; shallow lithic phase	rapid	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures.

* BONNER Soil Association - BO (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BO5	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
BO6	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Bonner soils.
BO7	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
BO8	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* BRENNAN Soil Association - BB

Brennan soils occur in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in blocky and rubbly sandy colluvial materials, generally <1 m thick and derived from non-calcareous sandstone, quartzite and conglomerate (Plate 3.5). Slopes are steep, usually well in excess of 30%. Elevations vary between 1350 and 1800 m asl.

Brennan soils are generally rapidly drained and rapidly pervious. Textures range from gravelly loam to very gravelly loamy sand; gravelly sandy loam is most common, however. Coarse fragment contents vary between 25 and 90%, and consist mainly of angular gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface. It overlies a 25 to 40 cm thick, light yellowish brown (dry), extremely to strongly acid horizon (Bm), which grades (BC) to relatively unweathered, medium to slightly acid parent material (C) at depths below 50 cm. Bedrock occurs within 100 cm of the surface. The usual classification is **Orthic Dystric Brunisol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
BB1	Orthic Dystric Brunisol;shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
BB2	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase, Orthic Sombric Brunisol; shallow lithic phase	rapid	Less common soils occur in climatically or edaphically drier locations, or on less acidic parent materials. The former has a shallower, medium to slightly acid, solum (Bm) while the latter, under grassy vegetation, has a well developed organic matter enriched surface horizon (Ah).
BB3	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically wetter locations and has a strong yellowish brown, podzolized (Bf) upper horizon. it is equivalent to the Bunyon 1 association component.
BB4	Orthic Dystric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase	rapid	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.

* BRENNAN Soil Association - BB (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
BB5	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
BB6	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Brennan soils.
BB7	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
BB8	Orthic Dystric Brunsiol; shallow lithic phase	rapid	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

BUHL CREEK Soil Association - BH

Buhl Creek soils occupy limited areas in the Purcell Mountains, within the lodgepole pine - Engelmann spruce - alpine fir subzone of the Interior western hemlock - western red cedar Forest Zone (Figure 3.6). They have developed in rubbly colluvial materials that are mostly <1 m thick and derived from medium to coarse grained, non-calcareous bedrocks. Slopes are steep, usually well in excess of 30%, while elevations range between 1350 and 1650 m asl.

Buhl Creek soils are generally rapidly drained and rapidly pervious. Textures range from gravelly sandy loam (most common) to very gravelly loamy sand. Coarse fragment contents vary between 25 and 90% and consist mostly of angular gravels with some cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a <5 cm thick, often discontinuous, grayish, leached horizon (Ae). The Ae overlies a 40 to 60 cm thick, yellowish-brown (dry), extremely to strongly acidic horizon (Bm), that grades (BC) to relatively unweathered, moderately to slightly acid parent materials (C). Bedrock is encountered at depths between 50 and 100 cm. The usual classification is **Orthic Dystric Brunisol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
BH1	Orthic Dystric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
BH2	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Less common soil has a thinner, medium to slightly acid upper horizon (Bm), due to occurrence in climatically or edaphically drier locations, or on less acidic parent materials.
BH3	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Less common soil has a yellowish brown (dry), very strongly acid, podzolized upper horizon (Bf) due to occurrence in climatically or edpahically wetter locations.
BH4	Orthic Dystric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase	rapid	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
BH5	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.

BUHL CREEK Soil Association - BH (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BH6	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Buhl Creek soils.
BH7	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
BH8	Orthic Dystric Brunisol; shallow lithic phase	rapid	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	rapid	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface or subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Buhl Creek soil association was not described in detail or sampled in the current study. It was described, sampled and analyzed, however, for the bulletins: Soil Resources of the Nelson Map Area and Soil Resources of the Lardeau Map Area, and that data is available from the B.C. Soil Information System.

* BUNYON Soil Association - BP

Bunyon soils occupy limited areas at higher elevations in the Fernie Basin, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly sandy colluvial materials which are generally <1 m thick and derived from non-calcareous, coarse grained sandstone, quartzite and conglomerate (Plates 3.5, 4.3, 4.8). Slopes are mostly well in excess of 30% in the steep, mountain summit topography. Elevations range from 1800 and 2300 m asl.

Bunyon soils are generally rapidly drained and rapidly pervious. Textures vary from gravelly loam to very gravelly loamy sand, although gravelly sandy loam is most common. Coarse fragment contents vary between 30 and 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, grayish, leached horizon (Ae), which, in turn, overlies a 20 to 40 cm thick, strong brown (dry), extremely to strongly acid, podzolized horizon (Bf). The Bf horizon grades (Bm, BC) to relatively unweathered, strongly to slightly acid parent material (C) at about 50 cm depth. Bedrock is encountered at depths between 50 and 100 cm. The usual classification is **Orthic Humo-Ferric Podzol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
BP1	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
BP2	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase, Orthic Sombric Brunisol; shallow lithic phase	rapid	The first less common soil occurs in climatically or edaphically drier locations. It has a light yellowish brown, strongly to moderately acid, brunisolic upper horizon (Bm) and is equivalent to the Brennan 1 soil association component. Under grassy vegetation, it may have a well developed, organic matter enriched surface horizon (Ah).
BP3	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Ferro-Humic Podzol; shallow lithic phase, Sombric Humo-Ferric Podzol; shallow lithic phase	well to moderately well	Less common soils occur in climatically or edaphically wetter locations. They have organic matter enriched upper horizons (Bhf, Ah).

* BUNYON Soil Association - BP (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BP4	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Podzolic Gray Luvisol; shallow lithic phase, Luvisolic Humo-Ferric Podzol; shallow lithic phase	rapid	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures.
BP5	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
BP6	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Bunyon soils.
BP7	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
BP8	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* BURTONTOWN Soil Association - BN

Burtontown soils occupy limited areas in the Purcell Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine - western larch subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in rubbly colluvial materials derived from medium grained, non-calcareous bedrocks, are usually <1 m thick, and occur on slopes that range between 30 and 100% (Plate 3.7). Elevations range from 1200 to 1350 m asl.

Burtontown soils are generally rapidly drained and rapidly pervious. Textures range from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment content ranges between 25 and 90%, and consists of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and overlies a <5 cm thick, grayish, leached horizon (Ae). The Ae overlies a 20 to 50 cm thick, yellowish-brown (dry), extremely to very strongly acid horizon (Bm) which grades (BC) to relatively unweathered, strongly acid parent material (C). Bedrock is encountered at depths between 50 and 100 cm. The usual classification is **Orthic Dystric Brunisol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
BN1	Orthic Dystric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
BN2	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically drier locations, or on somewhat less acidic parent materials. It has a shallower, medium to slightly acid Bm horizon and is equivalent to the Ryanier 1 soil association component.
BN3	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically wetter locations and contains a podzolized, extremely to very strongly acid upper horizon (Bf). It is equivalent to the Bonner 1 soil association component.
BN4	Orthic Dystric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase	rapid	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.

* BURTONTOWN Soil Association - BN (Continued)

Soil Assoc. Component	Most Common Soil Classification	 Drainage	Less Common Soil Classification	 Drainage	Comments
BN5	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
BN6	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Burtontown soils.
BN7	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
BN8	Orthic Dystric Brunisol; shallow lithic phase	rapid	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur in avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

CADORNA Soil Association - CA

Cadorna soils occur in the Fernie Basin, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty clayey fluvial fans and veneers derived from predominantly dark coloured shale. They overlie gravelly fluvioglacial or fluvial terraces. Slopes are usually gentle but may range up to 15%. Elevations vary between 1050 and 1350 m asl.

Cadorna soils are mostly moderately well drained and moderately to slowly pervious. Silty clay loam is the most common texture, but silt loam also occurs. The subsoil fluvioglacial and fluvial deposits range from gravelly loam to very gravelly loamy sand. Coarse fragment content in the surface usually consists of up to 20% shaly gravels, while the subsoil may contain up to 80% rounded gravels and cobbles. A fibrimor forest floor layer up to 5 cm thick overlies a 20 to 25 cm thick, light gray, very strongly to strongly acid, very friable, leached eluvial horizon (Ae) which, in turn, is underlain by a 25 to 40 cm thick clay accumulation zone (Bt) which is brown in colour and strong angular blocky. The Bt grades (BC) to medium or slightly acid parent material (C), resembling the clay accumulation horizon at depths below 65 cm. The gravelly subsoil (IIC) is encountered at about 90 to 100 cm depth. The usual classification is **Orthic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
CA1	Orthic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
CA2	Orthic Gray Luvisol	moderately well	Orthic Eutric Brunisol	well	Less common soil lacks a well developed clay accumulation horizon. It has a medium acid, very pale brown, less intensely weathered and leached solum (Bm or Btj) due to its occurrence in climatically or edaphically drier locations, or on more basic parent materials.
CA3	Orthic Gray Luvisol	moderately well	Brunisolic Gray Luvisol	moderately well	Less common soil has a pale brown, brunisolic surface horizon (Bm) due to its occurrence in climatically or edaphically wetter locations.
CA4	Orthic Gray Luvisol	moderately well	Orthic Dystric Brunisol	moderately well	Less common soil lacks a well developed clay accumulation horizon due to somewhat coarser than usual textures.
CA7	Orthic Gray Luvisol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance and/or deposition.

The Cadorna soil association was not described in detail, or sampled. A soil with similar morphology that was described, sampled and analyzed is the Frontal soil association.

* CAITHNESS Soil Association - CAI

Caithness soils occur at lower elevations in major valleys of the Rocky Mountains and in the Rocky Mountain Trench, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in blocky and rubbly silty to sandy colluvial materials mostly >1 m thick derived from non-calcareous bedrocks (Plate 4.18). The steep slopes are usually well in excess of 30%. Elevations range between 1050 and 1350 m asl.

Caithness soils are generally well drained and, depending upon coarse fragment content, are either moderately or rapidly pervious. Textures range from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment contents range from 30 to 80% and consist of slaty gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface. It overlies a 10 to 35 cm thick, light yellowish brown, strongly to medium acid horizon (Bm) which grades (BC) to relatively unweathered, medium to slightly acid parent material (C) at about 50 cm depth. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CAI1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
CAI2	Orthic Eutric Brunisol	well	Orthic Dark Brown, Orthic Melanic Brunisol	well	Less common soils occur in climatically or edaphically drier locations under grassy vegetation and have organic matter enriched surface horizons (Ah).
CAI3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil occurs in climatically or edaphically wetter locations or on less calcareous parent materials and has a yellowish brown, strongly acid upper (Bm) horizon. It is equivalent to the Calderol 1 soil association component.
CAI4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol, Orthic Gray Luvisol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to somewhat finer textures. On drier sites they may lack a Bm surface horizon.
CAI7	Orthic Eutric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* CALAMITY Soil Association - CL

Calamity soils occupy limited areas in the Purcell Mountains, within the lodgepole pine - Engelmann spruce - alpine fir subzone of the Interior western hemlock - western red cedar Forest Zone (Figure 3.6). They have developed in rubbly colluvial materials derived from fine to medium grained, non-calcareous bedrocks. The colluvial materials are usually >1 m thick and occur on 30 to 100% slopes. Elevations range from 1350 to 1650 m asl.

Calamity soils are generally well drained and moderately to rapidly pervious. Textures range from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment contents vary from 30 to 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface. It overlies a 30 to 70 cm thick, yellowish-brown (dry), strongly to extremely acid horizon (Bm) which grades (BC) to relatively unweathered, moderately to slightly acid parent material (C) at about 90 cm depth. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CL1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
CL2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations, or on somewhat less acidic parent materials. It has a thinner, light yellowish brown, medium to slightly acid upper horizons (Bm), and is equivalent to the Cold Creek 1 soil association component.
CL3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well	Less common soil occurs in climatically or edaphically wetter locations. It contains a podzolized, dark yellowish brown (dry), very strongly acid upper horizon (Bf) and is equivalent to the Clifty 1 soil association component.
CL4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CL7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

*CALAMITY Soil Association - CL (Continued)

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
CL8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may contain organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* CALDEROL Soil Association - CJ

Calderol soils occur in the Rocky Mountains, within the Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Figure 3.8; Plates 4.1, 4.18). They have developed in rubbly colluvial materials generally >1 m thick and derived from non-calcareous, medium to fine grained bedrocks. The steep slopes are usually well in excess of 30%. Elevations range from 1350 to 1800 m asl.

Calderol soils are generally well drained and moderately to rapidly pervious. Textures vary from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment contents range between 30 and 80% and consist of slaty gravels, cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. It overlies a 25 to 35 cm thick, light yellowish brown, very strongly to strongly acid horizon (Bm), which grades (BC) to relatively unweathered, very strongly to strongly acid parent material (C) at about 50 cm. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CJ1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
CJ2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations, or on somewhat less acidic parent materials. It has a thinner, medium acid to neutral, upper horizon (Bm).
CJ3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well	Less common soil occurs in climatically or edaphically wetter locations and has a podzolized, strong brown, very strongly acid upper (Bf) horizon.
CJ4	Orthic Dystric Brunisol	well	Brunisolic Grey Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CJ7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

*** CALDEROL Soil Association - CJ (Continued)**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CJ8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may contain organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

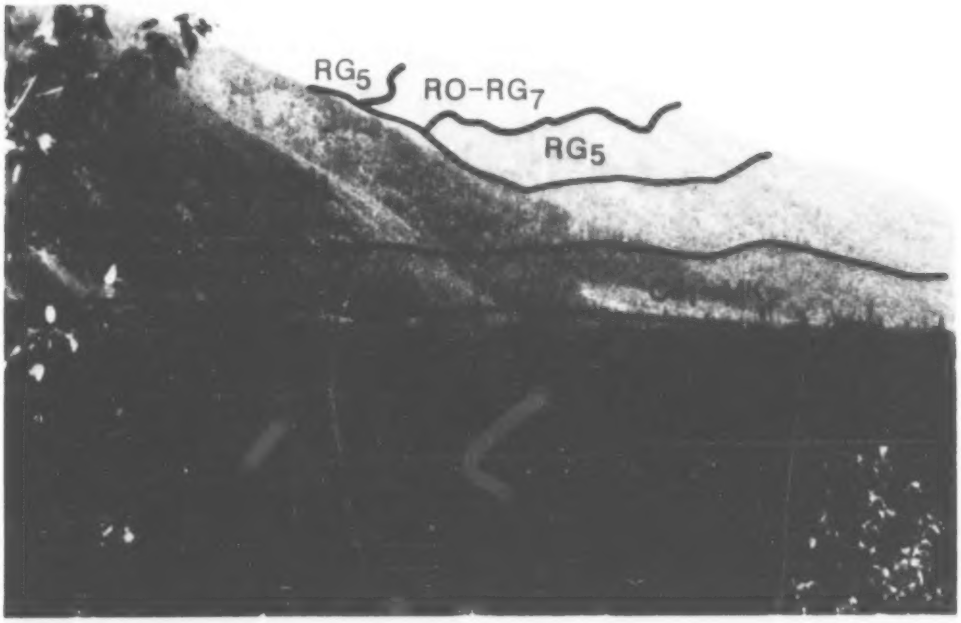


Plate 4.1 Soils of the Wigwam River Valley (see text for explanation of symbols).

* CAYUSE Soil Association - CE

Cayuse soils occupy limited areas in the Purcell Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine - western larch subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in rubbly colluvial materials derived from medium grained, non-calcareous bedrocks. The colluvial materials are usually >1 m thick and occur on slopes that vary between 30 and 100%. Elevations range from 1200 to 1350 m asl.

Cayuse soils are generally well drained and moderately to rapidly pervious. Textures range widely from gravelly silty clay loam to very gravelly sandy loam, but gravelly silt loam is most common. Coarse fragment contents range between 30 and 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface. It overlies a 40 to 60 cm thick, brownish-yellow (dry), extremely to strongly acid horizon (Bm) which grades (BC) to relatively unweathered, extremely acid parent material (C) at about 70 cm. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CE1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
CE2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations, or on somewhat less acidic parent materials. It has a thinner, medium to slightly acid Bm horizon and is equivalent to the Cold Creek 1 soil association component.
CE3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well	Less common soil occurs in climatically or edaphically wetter locations and contains a podzolized, yellowish-brown, extremely to very strongly acid upper horizon (Bf). It is equivalent to the Champion 1 soil association component.
CE4	Orthic Dystric Brunisol	well	Brunisolic Grey Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CE7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

* CAYUSE Soil Association - CE (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CE8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* CEDRUS Soil Association - CD

Cedrus soils occur in the White River and upper Kootenay River drainages of the Rocky Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty morainal materials (till) derived from phyllitic bedrocks (Plate 4.6). The till deposits are generally >1 m thick and mostly occur on valley floors and lower valley sides. Slopes usually vary between 10 and 60%, while elevations range between 1050 and 1350 m asl.

Cedrus soils are generally well drained and moderately to slowly pervious. Textures are silt loam (most common), gravelly silt loam, or occasionally, very gravelly silt loam. Coarse fragment contents are mostly less than 25%, but locally range as high as 60% and consist mostly of slaty gravels. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a 5 to 20 cm thick, light yellowish brown (dry), medium to slightly acid horizon (Bm). A weakly developed clay accumulation horizon (Btj) may be present, and grades (BCk) to relatively unweathered, mildly to moderately alkaline parent material (Ck) at about 40 to 50 cm depth. Cedrus soils are transitional to Luvisols, but lacking well developed clay accumulation horizons in the subsurface, are classified as **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CD1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
CD2	Orthic Eutric Brunisol	well	Orthic Eutric Brunisol; calcareous phase	well	Less common soil occurs in climatically or edaphically drier locations. It is generally alkaline to the surface, but otherwise resembles the most common soil.
CD3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil occurs in climatically or edaphically wetter areas, or on less basic parent materials. It has a thicker, dark yellowish brown, very strongly to strongly acid upper horizon (Bm).
CD4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol, Orthic Gray Luvisol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. On drier sites they may lack an upper Bm horizon.
CD5	Orthic Eutric Brunisol	well	Orthic Eutric Brunisol; shallow lithic phase	rapid	Less common soil is 50 to 100 cm thick over bedrock.

* CEDRUS Soil Association - CD (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CD7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* CERVIL Soil Association - CR

Cervil soils occur in both the Rocky and Purcell mountains, and in the Rocky Mountain Trench, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone (Plate 3.2). They have developed in rubbly colluvial materials derived from calcareous bedrocks that are usually >1m deep and occur on 30 to 100% slopes. Elevations range between 1050 and 1350 m asl.

Cervil soils are generally well drained and moderately to rapidly pervious. Textures range between gravelly silt loam and very gravelly loamy sand. Gravelly silt loam is most common, however. Coarse fragment contents vary between 30 and 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. It overlies a 5 to 10 cm thick, dark yellowish brown to strong brown, medium acid to neutral horizon (Bm) which grades (Bmk, BCk) to a moderately alkaline, carbonate enriched subsoil (Cca, Ck) at about 50 cm. The carbonates occur as white accumulations on the undersides of coarse fragments. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
CR1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
CR2	Orthic Eutric Brunisol	well	Orthic Dark Brown	well	Less common soil has a well developed, organic matter enriched surface horizon (Ah) due to its occurrence in climatically or edaphically drier locations dominated by grassy vegetation.
CR3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil has a thicker, dark yellowish brown, extremely to strongly acid upper horizon (Bm) due to its occurrence in climatically or edaphically moister locations, or has developed in somewhat less calcareous parent material.
CR4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol, Orthic Gray Luvisol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. On drier sites they may lack an upper Bm horizon.

* CERVIL Soil Association - CR (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CR7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

CHAMPION Soil Association - CH

Champion soils occupy limited areas at higher elevations in the Purcell Mountains, within the forested subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial materials which are mostly >1 m thick and derived from medium grained, non-calcareous bedrocks. Topography is typical of mountain summits with slopes ranging from 30 to 100%. Elevations vary between 1500 and 2300 m asl.

Champion soils are generally well drained and moderately to rapidly pervious. Textures vary from gravelly silt loam (most common) to very gravelly sandy loam, while coarse fragment contents range between 30 and 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 12 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, grayish, leached horizon (Ae) which, in turn, overlies a 20 to 40 cm thick, yellowish-brown (dry), extremely to very strongly acid, podzolized horizon (Bf). This horizon grades (Bm, BC) to relatively unweathered, extremely acid parent material (C) at about 60 cm. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
CH1	Orthic Humo-Ferric Podzol	well			Consists dominantly of the most common soil as described above.
CH2	Orthic Humo-Ferric Podzol	well	Orthic Dystric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations and has a brownish-yellow (dry), brunisolic, strongly acid upper horizon (Bm). It is equivalent to the Cayuse 1 soil association component.
CH3	Orthic Humo-Ferric Podzol	well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
CH4	Orthic Humo-Ferric Podzol	well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CH7	Orthic Humo-Ferric Podzol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

CHAMPION Soil Association - CH (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
CH8	Orthic Humo-Ferric Podzol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Champion soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Cayuse soil association.

CLIFTY Soil Association - CF

Clifty soils occupy limited areas at the higher elevations in the Purcell Mountains, within the forested subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial materials mostly >1 m thick derived from medium to coarse grained, non-calcareous bedrocks. The topography is typical of mountain summits; slopes vary from 30 to 100%, while elevations range between 1500 and 2300 m asl.

Clifty soils are mostly well drained and are moderately to rapidly pervious. Textures range from gravelly sandy loam (most common) to very gravelly loamy sand. Between 30 and 80% coarse fragments occur and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 12 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, grayish, leached horizon (Ae) which is underlain by a 40 to 60 cm thick, yellowish-brown (dry), very strongly acid, podzolized horizon (Bf). The Bf horizon grades (Bm, BC) to relatively unweathered, moderately to slightly acid parent material (C) at about 75 cm. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CF1	Orthic Humo-Ferric Podzol	well			Consists dominantly of the most common soil as described above.
CF3	Orthic Humo-Ferric Podzol	well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.

The Clifty soil association was not described in detail or sampled for the current study. It was described, sampled and analyzed, however, for the bulletins: Soil Resources of the Nelson Map Area and Soil Resources of the Lardeau Map Area, and that data is available from the B.C. Soil Information System.

COAL CREEK Soil Association - CC

Coal Creek soils occupy limited areas at lower elevations in the Fernie Basin, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in rubbly fine colluvial materials generally >1 m thick and derived from friable, usually non-calcareous shale (Plate 3.4). Slopes vary between 30 and 100%, while elevations range from 1050 to 1350 m asl.

Coal Creek soils are mostly well drained, and moderately to slowly pervious. Textures range from silty clay loam (most common) to clay loam and locally are sometimes gravelly. Coarse fragment contents are usually less than 20% but, occasionally, may range to 80% and consist mostly of shaly gravels. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface and overlies a 20 to 40 cm thick, light yellowish brown, strongly to medium acid horizon (Bm). A weakly developed, clay enriched horizon (Btj) is often present, grading (BC) to brown or dark brown, medium acid to mildly alkaline parent material (C, Ck) at about 60 cm depth. The soil often resembles a Brunisolic Gray Luvisol, but lacks sufficient clay enrichment in the subsurface and is classified as a **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CC1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
CC2	Orthic Eutric Brunisol	well	Orthic Eutric Brunisol; calcareous phase, Orthic Melanic Brunisol	well	Less common soils occur in climatically or edaphically drier locations, or have developed on calcareous shales. They may be calcareous to the surface or may, under grassy vegetation have an organic matter enriched upper horizon (Ah).
CC3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil occurs in climatically or edaphically wetter locations and has an extremely to strongly acid upper (Bm) horizon. It is equivalent to the Corbin 1 soil association component.
CC4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a clay enriched subsurface (Bt) horizon.
CC7	Orthic Eutric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

The Coal Creek soil association was not described in detail, or sampled. A soil with similar morphology that was described, sampled and analyzed is the Corbin soil association.

* COCHRAS Soil Association - CK

Cochras soils occur in the White River and upper Kootenay River drainages of the Rocky Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in slaty silty colluvium derived from phyllitic bedrocks (Plate 4.11). The deposits are generally >1 m thick and occur on slopes between 30 and 100%. Elevations range between 1050 and 1350 m asl.

Cochras soils are generally well drained and moderately pervious. Textures are silt loam (most common), gravelly silt loam, or occasionally, very gravelly silt loam. Coarse fragment contents are mostly less than 25%, but locally range as high as 80% and consist mostly of slaty gravels. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface and overlies a 5 to 20 cm thick, light yellowish brown, medium acid to neutral horizon (Bm). A weakly developed clay accumulation horizon (Btj) may be present, and grades (BC) to relatively unweathered, medium acid to neutral parent material (C, Ck) at about 40 to 50 cm depth. The Cochras soils are transitional to Luvisols, but lacking well developed clay accumulation horizons in the subsurface, are classified as **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
CK1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
CK3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil occurs in climatically or edaphically wetter areas, or on less alkaline parent materials. It has a thicker, dark yellowish brown, very strongly to strongly acid upper horizon (Bm) and is equivalent to the Courcellette 1 soil association component.
CK4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol, Orthic Gray Luvisol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. On drier sites they may lack an upper Bm horizon.
CK7	Orthic Eutric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

COKATO Soil Association - CO

Cokato soils occupy limited areas at lower elevations in the Fernie and Flathead Basins, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in rubbly fine morainal deposits on valley floors and lower valley walls (Plate 3.4). The till is generally >1 m thick and derived from friable, usually non-calcareous shale. Slopes vary between 10 and 60%, while elevations range from 1050 to 1350 m asl.

Cokato soils are mostly well drained, and slowly to moderately pervious. Textures range from silty clay loam (most common) to silt loam and, locally, are sometimes gravelly. Coarse fragment contents are usually less than 20% but, occasionally, may range to 60% and consist mostly of shaly gravels. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a 20 to 40 cm thick, pale brown to yellowish-brown (dry), very strongly to strongly acid horizon (Bm). A 5 to 30 cm thick, weakly developed, clay enriched horizon (Btj) is often present under this which grades (BC) to brown or dark brown, medium acid to mildly alkaline parent material (C, Ck) at about 50 cm depth. The soil often resembles a Brunisolic Gray Luvisol, but lacks sufficient clay enrichment in the subsurface, and is classified as a **Orthic Dystric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
C01	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
C02	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations, or has developed on calcareous shales. It has a shallower, medium acid to mildly alkaline solum.
C03	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well	Less common soil occurs in climatically or edaphically wetter locations and has a podzolized, upper horizon (Bf) >10 cm thick.
C04	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol, Orthic Gray Luvisol	well	Less common soils contain a well developed clay enriched horizon due to slightly finer textures. On drier sites they may lack an upper Bm horizon. The first listed is equivalent to the Morrissette 1 soil association component.
C05	Orthic Dystric Brunisol	well	Orthic Dystric Brunisol; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.

COKATO Soil Association - CO (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
C07	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

The Cokato soil association was not described in detail, or sampled. A soil with similar morphology that was described, sampled and analyzed is the Morrissette soil association.

* COLD CREEK Soil Association - CLD

Cold Creek soils occur in the drier portions of the Purcell Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in rubbly colluvial materials derived from fine to medium grained, non-calcareous bedrocks. The materials are usually >1 m deep and occur on 30 to 100% slopes. Elevations range from 1050 to 1350 m asl.

Cold Creek soils are mainly well drained and moderately pervious. Textures vary from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment contents range between 30 and 80% and consist mainly of angular gravels with some cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. Under this is a <5 cm thick, discontinuous, grayish, leached horizon (Ae) which, in turn, is underlain by a 20 to 50 cm thick, light yellowish brown, medium to slightly acid (Bm) horizon. The latter grades (BC) to relatively unweathered, slightly acid to neutral parent material (C) at about 60 cm depth. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CLD1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
CLD2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol	well to rapid	Less common soil occurs in climatically or edaphically drier locations dominated by grassy vegetation. It is characterized by a well developed, dark coloured, organic matter enriched surface horizon (Ah).
CLD3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	well	Less common soils occur in climatically or edaphically wetter locations, or on more acidic parent materials. They have thicker, yellowish-brown (dry), extremely to strongly acid upper horizons (Bm, Bf) and are respectively equivalent to Calamity 1 and Champion 1 soil association components.
CLD4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol, Orthic Gray Luvisol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. In drier locations they may lack an upper Bm horizon.

* COLD CREEK Soil Association - CLD (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
CLD7	Orthic Eutric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent deposition or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* COLIN CREEK Soil Association - COL

Colin Creek soils occur in the Rocky Mountain Trench and in a few adjacent valleys in the Rocky and Purcell mountains, within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone (Figure 3.1). They have developed in rubbly colluvial materials derived from calcareous bedrocks. The colluvial materials are usually >1 m deep and occur on 30 to 100% slopes. Elevations range between 700 and 1050 m asl.

Colin Creek soils are generally well drained and moderately to rapidly pervious. Textures are variable and range from gravelly silt loam (most common) to very gravelly loamy sand. Coarse fragment contents vary between 30 and 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. It overlies a 5 to 15 cm thick, light yellowish brown to brown (dry), medium acid to neutral horizon (Bm) which grades (Bmk, BCk) to moderately alkaline, carbonate enriched subsoil horizons (Cca, Ck) at about 40 cm depth. The carbonates occur as white coatings on the undersides of coarse fragments. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
COL1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
COL2	Orthic Eutric Brunisol	well	Orthic Dark Brown, Orthic Melanic Brunisol	rapid to well	Less common soils have a well developed, organic matter enriched surface horizon (Ah) due to their occurrence in climatically or edaphically drier locations dominated by grassy vegetation.
COL4	Orthic Eutric Brunisol	well	Orthic Gray Luvisol	well	Less common soil contains a subsurface clay accumulation horizon (Bt) due to slightly finer textures.
COL7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

COLUMBINE Soil Association - CM

Columbine soils occur at the rugged, upper elevations of the Rocky Mountains and portions of the Purcell Mountains (Figure 3.2), within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial deposits usually >1 m deep and derived from calcareous bedrocks (Plates 4.2, 4.9, 4.13). The mountain summit topography has slopes between 30 and 100%. Elevations range between 1800 and 2300 m asl.

Columbine soils are generally well drained and moderately to rapidly pervious. Textures are variable and range from gravelly silt loam to very gravelly loamy sand. Gravelly silt loam is most common, however. Coarse fragment contents vary between 30 and 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick normally occurs at the soil surface and overlies a thin, discontinuous, grayish, leached horizon (Ae). These overlie a 10 to 20 cm thick, strong brown, medium acid, podzolized horizon (Bf) which grades (Bm, Bmk, BCk) to neutral or mildly alkaline, carbonate enriched subsoil horizons (Cca, Ck) at about 30 to 40 cm depth. The carbonates occur as white coatings on the undersides of coarse fragments. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CM1	Orthic Humo-Ferric Podzol	well			Consists dominantly of the most common soil as described above.
CM2	Orthic Humo-Ferric Podzol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations, or on more highly calcareous parent materials. It has a thin, light yellowish brown, medium acid to neutral surface horizon (Bm) and is equivalent to the Couldron 1 soil association component.
CM3	Orthic Humo-Ferric Podzol	well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils occur in climatically or edaphically wetter locations. They have organic matter enriched upper horizons (Bhf, Ah).
CM4	Orthic Humo-Ferric Podzol	well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CM7	Orthic Humo-Ferric Podzol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent erosion or deposition.

COLUMBINE Soil Association - CM (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
CM8	Orthic Humo-Ferric Podzol	well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Columbine soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Couldron soil association.

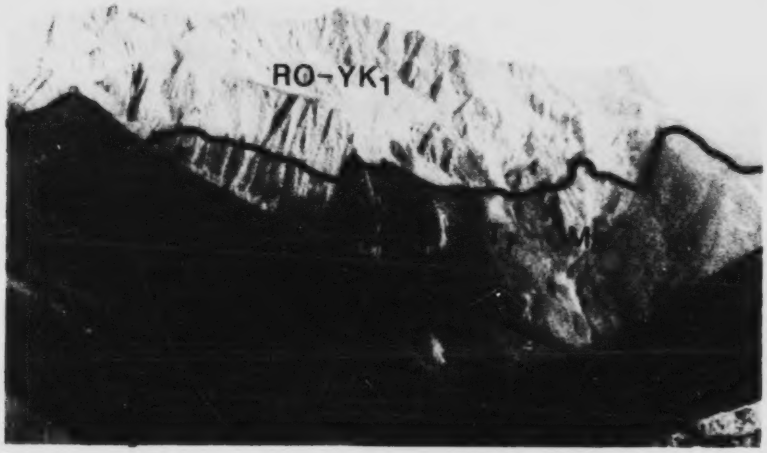


Plate 4.2 Soils in the Tangle Creek area, Rocky Mountains (see text for explanation of symbols).

CONNOR Soil Association - CZ

Connor soils occupy limited areas in the White River - upper Kootenay River drainages of the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Figure 3.5). They have developed in slaty silty colluvial deposits derived from phyllitic bedrocks (Plate 3.6). The deposits are usually >1 m thick and occur on 30 to 100% slopes. Elevations range between 1800 and 2300 m asl.

Connor soils are moderately well to well drained and moderately pervious. Textures vary from silt loam (most common) to very gravelly silt loam. Coarse fragment contents can range up to 80% but are mostly <20% and consist of mainly gravel sized, slaty fragments. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a thin, discontinous, grayish, leached horizon (Ae). These, in turn, overlie a 10 to 30 cm thick, dark yellowish brown to strong brown, extremely to strongly acid, podzolized horizon (Bf). A weakly developed clay accumulation horizon (Btj) is often present under the Bf. Relatively unweathered, neutral to slightly acid parent materials (C) are encountered at about 50 cm depth. Connor soils are transitional to Luvisols, but lacking well developed clay accumulation horizons, are classified as **Orthic Humo-Ferric Podzol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CZ1	Orthic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
CZ2	Orthic Humo-Ferric Podzol	moderately well	Orthic Dystric Brunisol	well	Less common soil has a thinner, brunisolic upper horizon (Bm) due to development in climatically or edaphically drier locations. It is equivalent to the Courcelette 1 soil association component.
CZ3	Orthic Humo-Ferric Podzol	moderately well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
CZ4	Orthic Humo-Ferric Podzol	moderately well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	moderately well	Less common soils have a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CZ7	Orthic Humo-Ferric Podzol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

CONNOR Soil Association - CZ (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
CZ8	Orthic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. The may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.
CZ9	Orthic Humo-Ferric Podzol	moderately well	Orthic Eutric Brunisol	well	Less common soil has a thin, light yellowish brown, medium acid to neutral surface horizon (Bm), due to development on calcareous parent material.

The Connor soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Courcelette soil association.

* CONRAD Soil Association - CI

Conrad soils occupy limited areas at the higher elevations in the Flathead and Fernie basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly sandy colluvial materials which are generally >1 m thick and derived from non-calcareous, coarse grained sandstone, quartzite and conglomerate (Plates 3.5, 4.3, 4.13). Slopes are usually well in excess of 30% in the steep mountain summit topography. Elevations range from 1800 to 2300 m asl.

Conrad soils are generally well to rapidly drained and rapidly pervious. Textures range from gravelly loam to very gravelly loamy sand, with gravelly sandy loam being the most common. Coarse fragment contents vary between 30 and 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, grayish, leached horizon (Ae) which, in turn, overlies a 20 to 30 cm thick, strong brown, extremely to strongly acid, podzolized horizon (Bf). The Bf horizon grades (Bm, BC) to relatively unweathered, extremely to slightly acid parent material (C) at about 50 cm. The usual classification is Orthic Humo-Ferric Podzol.

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CI1	Orthic Humo-Ferric Podzol	well			Consists dominantly of the most common soil as described above.
CI2	Orthic Humo-Ferric Podzol	well	Orthic Dystric Brunisol	well to rapid	Less common soil occurs in climatically or edaphically drier locations. It has a light to dark yellowish brown, very strongly to strongly acid, brunisolic upper horizon (Bm) and is equivalent to the Coubrey 1 soil association component.
CI3	Orthic Humo-Ferric Podzol	well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	well to moderately well	Less common soils occur in climatically or edaphically wetter locations. They have organic matter enriched upper horizons (Bhf, Ah).
CI4	Orthic Humo-Ferric Podzol	well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CI7	Orthic Humo-Ferric Podzol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

* CONRAD Soil Association - CI (Continued)

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CI8	Orthic Humo-Ferric Podzol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface or subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

BP_5-CI_8
CB_1-MU_1

Plate 4.3 Soils in the Sparwood Ridge-Fir Creek area (see text for explanation of symbols).

COOPER Soil Association - CP

Cooper soils occupy limited areas in the Purcell Mountains, within the lodgepole pine - Engelmann spruce - alpine fir subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in rubbly colluvial materials that are mostly >1 m thick and derived from medium to coarse grained, non-calcareous bedrocks. Slopes are steep, usually well in excess of 30%. Elevations range between 1350 and 1650 m asl.

Cooper soils are generally well to rapidly drained and rapidly to moderately pervious. Textures range from gravelly sandy loam (most common) to very gravelly loamy sand. Coarse fragment contents vary between 30 and 80% and consist mostly of angular gravels with some cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface. It overlies a 40 to 60 cm thick, light yellowish brown (dry), very strongly to strongly acid horizon (Bm) that grades (BC) to relatively unweathered, moderately to slightly acid parent materials (C) at about 80 cm depth. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CP1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
CP2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well to rapid	Less common soil has a thinner, medium to slightly acid upper horizon (Bm) due to occurrence in climatically or edaphically drier locations, or on less acidic parent materials. It is equivalent to the Cold Creek 1 soil association component.
CP3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well	Less common soil has a yellowish-brown (dry), very strongly to extremely acid, podzolized upper horizon (Bf) due to occurrence in climatically or edaphically wetter locations.
CP4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CP7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

COOPER Soil Association - CP (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CP8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface or subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Cooper soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Calamity soil association.

* CORBIN Soil Association - CX

Corbin soils occupy limited areas in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly fine colluvial materials derived from friable, usually non-calcareous shale (Plates 4.4, 4.9). The colluvium is mostly >1 m thick and occurs on 30 to 100% slopes. Elevations range from 1350 to 1800 m asl.

Corbin soils are mostly moderately well drained and slowly to moderately pervious. Textures range from silty clay loam (most common) to clay loam which, locally, may be very gravelly. Coarse fragment contents are usually less than 20% but, occasionally, increase to 80% and consist of mostly gravel sized, shaly fragments. A fibrimor forest floor layer up to 8 cm thick generally occurs at the soil surface and overlies a 10 to 30 cm thick, dark yellowish brown, extremely to strongly acid horizon (Bm). Under this, a weakly developed clay accumulation horizon (Btj) is often present, which grades (BC) to very dark brown, strongly acid to neutral parent material (C) at about 60 to 70 cm depth. The soil often resembles a Brunisolic Gray Luvisol, but lacks sufficient clay enrichment in the subsurface and is classified as an **Orthic Dystric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CX1	Orthic Dystric Brunisol	moderately well			Consists dominantly of the most common soil as described above.
CX2	Orthic Dystric Brunisol	moderately well	Orthic Eutric Brunisol	well	Less common soil has thinner, medium acid to neutral upper horizons (Bm) due to occurrence in climatically or edaphically drier locations, or on less acidic parent material.
CX3	Orthic Dystric Brunisol	moderately well	Orthic Humo-Ferric Podzol	moderately well	Less common soil has a podzolized upper horizon (Bf) due to occurrence in climatically or edaphically wetter locations. It is equivalent to the Crossing 1 soil association component.
CX4	Orthic Dystric Brunisol	moderately well	Brunisolic Gray Luvisol	moderately well	Less common soil contains a clay enriched subsurface horizon (Bt).
CX7	Orthic Dystric Brunisol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

* CORBIN Soil Association - CX (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CX8	Orthic Dystric Brunisol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

N
FLATHEAD RIVER
MM$_4$–GD$_3$

Plate 4.4 Soils in the Cabin Creek area, Flathead Basin (see text for explanation of symbols).

CORNWELL Soil Association - COR

Cornwell soils occupy limited areas in the Elk and Flathead river drainages of the Rocky Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone (Figure 3.7). They have developed in rubbly sandy colluvial materials usually >1 m thick and derived from calcareous sandstone or mixed sandstone and limestone. Slopes are steep, usually well in excess of 30%. Elevations range from 1050 to 1350 m asl.

Cornwell soils are generally well drained and moderately to rapidly pervious. Textures range from gravelly loam to very gravelly loamy sand with gravelly sandy loam being the most common. Coarse fragment contents vary between 30 and 80% and consist of mainly angular gravels with lesser amounts of cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. It overlies a 5 to 20 cm thick, light yellowish brown (dry), medium acid to neutral horizon (Bm), that grades (Bmk, BCk) to moderately alkaline, carbonate enriched subsoil horizons (Cca, Ck) at about 60 cm depth. The subsoil horizons are characterized by white carbonate coatings on the undersides of coarse fragments. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
COR1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
COR2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol	rapid to well	Less common soil has a well developed, organic matter enriched surface horizon (Ah), due to occurrence in climatically or edaphically drier locations dominated by grassy vegetation.
COR3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil has a deeper, yellowish-brown, very strongly to strongly acid upper horizon (Bm) due to occurrence in climatically or edaphically wetter locations, or on less alkaline parent materials.
COR4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol, Orthic Gray Luvisol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. On drier sites they may lack an upper Bm horizon.
COR7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

The Cornwell soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Coulotte soil association.

CORRIGAN Soil Association - CQ

Corrigan soils only occur in limited areas at higher elevations in the Elk and Flathead river drainages, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly sandy colluvial materials which are usually >1 m deep and derived from calcareous sandstone or mixed sandstone and limestone (Plates 4.10, 4.14). Slopes are steep, generally well in excess of 30%. Elevations range from 1800 to 2300 m asl.

Corrigan soils are generally well drained and moderately to rapidly pervious. Textures range between gravelly loam and very gravelly loamy sand with gravelly sandy loam being the most common. Coarse fragment contents vary between 30 and 80% and consist of angular gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a thin, discontinuous, grayish, leached horizon (Ae). These overlie a 10 to 20 cm thick, yellowish-brown (dry), strongly to medium acid, podzolized horizon (Bf) that grades (Bm, Bmk, BCk) to a carbonate enriched, moderately alkaline subsoil (Cca, Ck) at about 60 cm depth. The carbonates occur as white coatings on the undersides of coarse fragments. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CQ1	Orthic Humo-Ferric Podzol	well			Consists dominantly of the most common soil as described above.
CQ2	Orthic Humo-Ferric Podzol	well	Orthic Eutric Brunisol	well	Less common soil has a less intensively weathered, light yellowish brown, medium acid to neutral upper horizon (Bm), due to occurrence in climatically or edaphically drier locations. It is equivalent to the Coulotte 1 soil association component.
CQ3	Orthic Humo-Ferric Podzol	well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to occurrence in climatically or edaphically wetter locations.
CQ4	Orthic Humo-Ferric Podzol	well	Podzolic Gray Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CQ7	Orthic Humo-Ferric Podzol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent erosion or deposition.

CORRIGAN Soil Association - CQ (Continued)

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
CQ8	Orthic Humo-Ferric Podzol	well	Cumulic Humic Regosol; calcareous phase; Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Corrigan soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Coulotte soil association.

COUBREY Soil Association - CB

Coubrey soils occur in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir-lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in blocky and rubbly sandy colluvial materials, generally >1 m thick and derived from non-calcareous sandstone, quartzite and conglomerate (Plates 3.5, 4.3). Slopes are steep, usually well in excess of 30%. Elevations vary between 1350 and 1800 m asl.

Coubrey soils are generally well drained and rapidly pervious. Textures range from gravelly loam to very gravelly loamy sand with gravelly sandy loam being the most common. Coarse fragment contents vary between 30 and 80%, and consist mainly of angular gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. It overlies a 10 to 30 cm thick, light to dark yellowish brown (dry), very strongly to strongly acid horizon (Bm) which grades (BC) to relatively unweathered, medium to slightly acid horizon material (C) at depths between 30 and 60 cm. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CB1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
CB2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier location or on less acidic parent material and has a thinner, medium to slightly acid upper horizon (Bm).
CB3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well	Less common soil occurs in climatically or edaphically wetter locations and has a strong brown, podzolized, upper horizon (Bf). It is equivalent to the Conrad 1 soil association component.
CB4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CB7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

COUBREY Soil Association - CB (Continued)

Soil Assoc. Component	Most Common Soil Classification	 Drainage	Less Common Soil Classification	 Drainage	Comments
CB8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

The Coubrey soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Conrad soil association.

COULDREY Soil Association - CY

Couldrey soils occur in the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial materials usually >1 m thick and derived from fine to medium grained, non-calcareous bedrocks. Slopes are steep, generally well in excess of 30%. Elevations range between 1800 and 2300 m asl.

Couldrey soils are generally moderately well drained and moderately to rapidly pervious. Textures range from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment contents vary between 30 and 80% and consist mostly of slaty gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 10 cm thick occurs at the soil surface under which a grayish, leached horizon (Ae) may be present. These overlie a 25 to 35 cm thick, yellowish brown (dry), very strongly to strongly acid, podzolized horizon (Bf), which grades (Bm, BC) to relatively unweathered, very strongly to strongly acid parent material (C) at about 50 cm depth. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
CY1	Orthic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
CY2	Orthic Humo-Ferric Podzol	moderately well	Orthic Dystric Brunisol	well	Less common soil has a less intensively weathered, thinner, light yellowish brown, upper horizon (Bm) due to occurrence in climatically or edaphically drier locations. It is equivalent to the Calderol 1 soil association component.
CY3	Orthic Humo-Ferric Podzol	moderately well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
CY4	Orthic Humo-Ferric Podzol	moderately well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	moderately well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CY7	Orthic Humo-Ferric Podzol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

COULDREY Soil Association - CY (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CY8	Orthic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface or subsurface horizons but otherwise are weakly developed due to recent erosion or deposition.
CY9	Orthic Humo-Ferric Podzol	moderately well	Orthic Eutric Brunisol	well	Less common soil has a thin, light yellowish brown, medium acid to neutral upper horizon (Bm) due to development on inclusions of calcareous parent material (siltstone).

The Couldrey soil association was not described in detail or sampled. A soil with similar morphology that was sampled is the Calderol soil association.

* COULDRON Soil Association - CW

Couldron soils occur in both the Rocky and Purcell mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial materials usually >1 m in depth and derived from a variety of calcareous bedrocks (Plates 3.3, 4.5, 4.7). Slopes are generally in excess of 30%. Elevations range between 1350 and 1800 m asl.

Couldron soils are generally well drained and moderately to rapidly pervious. Textures range between gravelly silt loam and very gravelly loamy sand. Gravelly silt loam is most common, however. Coarse fragment contents vary between 30 and 80% and consist mainly of angular gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 8 cm thick usually occurs at the soil surface. It overlies a 5 to 15 cm thick, dark yellowish brown to strong brown, medium acid to neutral horizon (Bm) which grades (Bmk, BCk) to a mildly or moderately alkaline, carbonate enriched subsoil (Cca, Ck) at about 25 cm depth. The carbonates are characterized by white accumulations on the undersides of coarse fragments. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
CW1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
CW2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol	rapid to well	Less common soil has a well developed, organic matter enriched surface horizon (Ah) due to occurrence in climatically or edaphically drier locations dominated by grassy vegetation.
CW3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil has a thicker, very strongly to strongly acid upper horizon (Bm) due to occurrence in climatically or edaphically wetter locations, or on less alkaline parent material.
CW4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer soil textures.
CW7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* COULDRON Soil Association - CW (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CW8	Orthic Eutric Brunisol	well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

Plate 4.5 Soils in the Galbraith Creek area, Bull River valley (see text for explanation of symbols).

* COULOTTE Soil Association - CU

Coulotte soils occupy limited areas in the Elk and Flathead river drainages of the Rocky Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly sandy colluvial materials, usually >1 m thick and derived from calcareous sandstone, or mixed sandstone and limestone (Plate 4.8). Slopes are usually well in excess of 30%. Elevations range between 1350 and 1800 m asl.

Coulotte soils are generally well drained and moderately to rapidly pervious. Textures range between gravelly loam and very gravelly loamy sand with gravelly sandy loam being the most common. Coarse fragment contents vary from 30 to 80% and consist mainly of angular gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. It overlies a 10 to 40 cm thick, dark yellowish brown to light yellowish brown, medium acid to neutral horizon (Bm), that grades (Bmk, BCk) to moderately alkaline, carbonate enriched parent material (Cca, Ck) at about 40 to 60 cm depth. The carbonates occur as white coatings on the undersides of coarse fragments. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CU1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
CU2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol	well to rapid	Less common soil has a well developed, matter enriched surface horizon (Ah) due to occurrence in climatically or edaphically drier locations dominated by grassy vegetation.
CU3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	well	Less common soils have thicker, strongly to medium acid upper horizons (Bm, Bf) due to occurrence in climatically or edaphically wetter locations. The podzolic soil is equivalent to the Corrigan 1 soil association component.
CU4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CU7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* COULOTTE Soil Association - CU (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CU8	Orthic Eutric Brunisol	well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise lack soil development due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* COURCELETTE Soil Association - CT

Courcelette soils occupy limited areas in the White and upper Kootenay river drainages of the Rocky Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in slaty silty colluvium usually >1 m deep and derived from phyllitic bedrocks (Plates 3.6, 4.2, 4.6). Slopes range from 30 to 100% while elevations vary between 1350 and 1800 m asl.

Courcelette soils are mostly moderately well drained and moderately pervious. Textures are silt loam, gravelly silt loam (most common), or occasionally, very gravelly silt loam. Coarse fragment contents are usually less than 30% but locally may increase to 80% and consist of slaty, mostly gravel sized fragments. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. It overlies a 10 to 20 cm thick, strong brown to dark yellowish brown, very strongly to strongly acid horizon (Bm). A weakly developed clay accumulation horizon (Btj) is often present under the Bm and grades (BC) to relatively unweathered, weakly acid parent material (C) at about 50 cm depth. Courcelette soils are transitional to Luvisols, but lacking well developed clay accumulation horizons in the subsurface, are classified as **Orthic Dystric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
CT1	Orthic Dystric Brunisol	moderately well			Consists dominantly of the most common soil as described above.
CT2	Orthic Dystric Brunisol	moderately well	Orthic Eutric Brunisol	well	Less common soil has a thinner, light yellowish brown, medium acid to neutral upper horizon (Bm) due to occurrence in climatically or edaphically drier locations. It is equivalent to the Cochras 1 soil association component.
CT3	Orthic Dystric Brunisol	moderately well	Orthic Humo-Ferric Podzol	moderately well	Less common soil has a podzoled upper horizon (Bf) due to occurrence in climatically or edaphically wetter locations. It is equivalent to the Connor 1 soil association component.
CT4	Orthic Dystric Brunisol	moderately well	Brunisolic Gray Luvisol	moderately well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
CT7	Orthic Dystric Brunisol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

* COURCELETTE Soil Association - CT (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CT8	Orthic Dystric Brunisol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed, due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

Plate 4.6 Soils in the upper Kootenay River valley, in the vicinity of Settlers' Road (see text for explanation of symbols).

* COYOTE CREEK Soil Association - COY

Coyote Creek soils occur in both the Rocky and Purcell mountains, within the krummholz subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Plate 3.3). They have developed in rubbly colluvial materials usually >1 m thick derived from a variety of calcareous bedrocks. Slopes in the rugged mountain topography vary from 60 to 100%, while elevations range between 2300 and 2450 m asl. Active nivation, solifluction and cryoturbation are locally evident.

Coyote Creek soils are mostly moderately well drained, but locally soil drainage can vary from well to imperfect. They are usually moderately to rapidly pervious. The most common textures are gravelly or very gravelly silt loam, but locally, can sometimes be as coarse as very gravelly loamy sand. Coarse fragment contents range from 30 to 80% and consist of mostly angular gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 15 cm thick is usually present at the soil surface in the krummholz forest areas. Under this is a 10 to 20 cm thick, dark brown, extremely to moderately acid, organic matter enriched and podzolized horizon (Bhf). This, in turn, is usually underlain by a relatively thin Bf or Bm horizon that grades (Bmk, BCk) to neutral or moderately alkaline, relatively unweathered parent material (Ck) at about 50 cm. The most commonly occurring soil development is **Orthic Ferro-Humic Podzol,** but at these high elevations, there is a great diversity of soils.

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
COY1	Orthic Ferro-Humic Podzol	moderately well			Consists dominantly of the most common soil as described above.
COY2	Orthic Ferro-Humic Podzol	moderately well	Orthic Humo-Ferric Podzol	well	Less common soil lacks organic matter enriched upper horizons due to occurrence in climatically or edaphically drier locations. It is equivalent to the Columbine 1 soil association component.
COY3	Orthic Ferro-Humic Podzol	moderately well	Sombric Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well to imperfect	Less common soils have well developed, organic matter enriched surface horizons (Ah) due to to occurrence in moist meadows between clumps of krummholz trees.
COY4	Orthic Ferro-Humic Podzol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
COY7	Orthic Ferro-Humic Podzol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

* COYOTE CREEK Soil Association - COY (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
COY8	Orthic Ferro-Humic Podzol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well to imperfect	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.
COY9	Orthic Ferro-Humic Podzol	moderately well	Orthic Eutric Brunisol, Orthic Dystric Brunisol	moderately well to well	Less common soils have weak solum development (Bm) due to relatively recent erosion or deposition.
COY10	Orthic Ferro-Humic Podzol	well	Orthic Melanic Brunisol, Orthic Sombric Brunisol	well	Less common soils have well developed, turfy, organic matter enriched surface horizons (Ah) developed under grassy vegetative cover. Subsurface horizons (Bm) are weakly developed.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* CROSSING Soil Association - CS

Crossing soils occupy limited areas at higher elevations in the Fernie and Flathead basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Figure 3.3). They have developed in rubbly fine colluvial materials derived from friable, usually non-calcareous shale. The deposits are mostly >1 m thick and occur on 30 to 100% slopes. Elevations range from 1800 to 2300 m asl.

Crossing soils are generally moderately well drained and slowly to moderately pervious. Textures vary from silty clay loam (most common) to clay loam and locally, are sometimes very gravelly. Coarse fragment contents are usually less than 20% but locally can range to 80% and consist of mostly gravel sized, shaly fragments. A fibrimor forest floor layer up to 10 cm thick occurs at the soil surface. It overlies a 10 to 20 cm thick, strong brown, extremely to strongly acid, podzolized horizon (Bf) which is usually underlain by a 10 to 20 cm thick, less strongly weathered brunisolic (Bm) horizon. A weakly developed, clay enriched subsurface horizon (Btj) is also commonly present and grades (BC) to very dark brown, extremely to strongly acid parent material (C) below about 50 cm. The soil resembles a Podzolic Gray Luvisol, but lacking sufficient clay enrichment in the subsurface, is classified as an **Orthic Humo-Ferric Podzol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CS1	Orthic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
CS2	Orthic Humo-Ferric Podzol	moderately well	Orthic Dystric Brunisol	well	Less common soil contains a thinner, yellowish-brown upper horizon (Bm) due to occurrence in climatically or edaphically drier locations. It is equivalent to the Corbin 1 soil association component.
CS3	Orthic Humo-Ferric Podzol	moderately well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
CS4	Orthic Humo-Ferric Podzol	moderately well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	moderately well	Less common soils contain a well developed clay accumulation horizon (Bt) in the subsurface.
CS7	Orthic Humo-Ferric Podzol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

* CROSSING Soil Association - CS (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CS8	Orthic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.
CS9	Orthic Humo-Ferric Podzol	moderately well	Orthic Eutric Brunisol	well	Less common soil has a thin, yellowish brown, medium acid to neutral upper horizon (Bm) due to development on inclusions of parent material derived from calcareous shales.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B. C. Soil Information System.

* CROWSNEST Soil Association - CN

Crowsnest soils occur in the Fernie Basin, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty sandy and sandy fluvial veneers overlying gravelly sandy floodplain deposits derived from areas characterized by mainly limestone, dolomite, sandstone, shale and coal (Figures 3.4, 3.7; Plates 3.4, 4.15). Slopes are usually <2% and elevations range from 1050 to 1350 m asl.

Crowsnest soils are mostly moderately well drained and moderately to rapidly pervious. Textures in the upper horizons range from fine sandy loam to silt loam with fine sandy loam being most common. Subsurface horizons range from gravelly sandy loam to very gravelly sand. Coarse fragment content in the surface horizons is mostly <20% and consists of rounded gravels, while the content in the subsoil ranges from 40 to 70% composed of rounded gravels and cobbles. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. Soil colours are comparatively dark (e.g. dark yellowish brown) due to the influence of dark coloured shale, coal and sandstone bedrocks. Mottles are not usually evident. Most Crowsnest soils have either weak, or no soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 10 cm thick consisting of plant litter and a thin, weakly alkaline, organic matter enriched surface horizon (Ahk) are usually present at the soil surface. They are underlain by mildly alkaline subsurface horizons (Ck). The usual classification is **Cumulic Regosol; calcareous phase,** although Orthic Regosol; calcareous phase is also common.

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CN1	Cumulic Regosol; calcareous phase	moderately well			Consists dominantly of the most common soil as described above.
CN3	Cumulic Regosol; calcareous phase	moderately well	Gleyed Cumulic Regosol; calcareous phase	imperfect to poor	Less common soil has weakly gleyed subsurface horizons (Cgjk) due to fluctuating or permanently high water tables. It usually occupies low lying areas in the floodplain landscape.
CN10	Cumulic Regosol; calcareous phase	moderately well	Rego Gleysol; calcareous phase, Terric Mesisol	poor to very poor	Less common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

* CROWSNEST Soil Association - (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
CN11	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Cumulic Regosol; calcareous phase	moderately well	Most common soils have strongly gleyed mineral soil horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Crowsnest soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

CUMMINGS Soil Association - CG

Cummings soils occupy limited areas at lower elevations in the Fernie Basin, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone (Figure 3.4). They have developed in rubbly sandy colluvial materials generally >1 m thick and derived from non-calcareous, coarse grained sandstone, quartzite and conglomerate. Slopes vary from 30 to 100%, while elevations range between 1050 and 1350 m asl.

Cummings soils are well to rapidly drained and rapidly pervious. Textures vary between gravelly loam and very gravelly loamy sand, with gravelly sandy loam being most common. Coarse fragment contents range from 30 to 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface and overlies a 20 to 40 cm thick, light yellowish brown horizon (Bm) that is extremely to strongly acid. This horizon grades (BC) into strongly to slightly acid, relatively unweathered parent material (C) below about 50 cm. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
CG1	Orthic Dystric Brunisol	well to rapid			Consists dominantly of the most common soil as described above.
CG2	Orthic Dystric Brunisol	well to rapid	Orthic Eutric Brunisol	well to rapid	Less common soil occurs in climatically or edaphically drier locations, or on less acidic parent material. It has a thinner, less acidic upper horizon (Bm).
CG3	Orthic Dystric Brunisol	well to rapid	Orthic Humo-Ferric Podzol	well	Less common soil occurs in climatically or edaphically wetter locations. It has a strong brown, podzolized (Bf) upper horizon and is equivalent to the Conrad 1 soil association component.
CG7	Orthic Dystric Brunisol	well to rapid	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

The Cummings soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Conrad soil association.

* ELKO Soil Association - E

Elko soils occur in the Rocky Mountain Trench under open forests and grasslands in the ponderosa-pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty sand fluvial or aeolian veneers overlying gravelly fluvioglacial outwash plains, terraces and fans that have been derived from areas of predominantly limestone and dolomite (Figure 3.1; Plate 3.2). Slopes are usually gentle but can range up to 30%. Elevations range between 700 and 1050 m asl.

Elko soils are well drained and moderately pervious. Textures usually range from fine sandy loam (most common) to silt loam in the surface horizons and from very gravelly silt loam to very gravelly loamy sand in the subsoil (gravelly sandy loam most common). Coarse fragment content of the subsoil is high (up to 80% rounded gravels and cobbles). A thin, raw moder consisting of forest litter overlying an organic matter enriched surface horizon (Ah) less than 4 cm thick may be present. Under this is a solum (Bm, Bmk, BCk), that is 20 to 30 cm thick, pale brown, slightly acid in the upper part and mildly alkaline with depth. Carbonate cemented, moderately alkaline subsoil layers (IICk, IICca) characterized by white carbonate coatings on the undersides of coarse fragments extend from the base of the solum to depths in excess of 1 m. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
E1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
E2	Orthic Eutric Brunisol	well	Orthic Dark Brown, Calcareous Dark Brown	well to rapid	Less common soils, developed under grassy vegetation, have a well developed, organic matter enriched surface horizon (Ah). Some may be mildly alkaline to the surface (Ahk). They are equivalent to the Saha 10 soil association component.
E4	Orthic Eutric Brunisol	well	Orthic Gray Luvisol, Brunisolic Gray Luvisol	well	Less common soils contain a clay accumulation horizon (Bt) due to somewhat finer textured parent materials. On drier sites they may lack an upper Bm horizon.
E10	Orthic Eutric Brunisol	well	Orthic Eutric Brunisol; calcareous phase	well	Less common soil is mildly alkaline to the surface (Bmk), but otherwise resembles the most common soil.

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* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* FADEWAY Soil Association - FD

Fadeway soils occur in the White and Kootenay river drainages of the Rocky Mountains, within the Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in silty gravelly floodplain deposits derived from areas characterized by phyllite, limestone and dolomite (Plate 3.6). Slopes are usually <2%, while elevations range from 1350 to 1800 m asl.

Fadeway soils are mostly moderately well drained and moderately pervious. Textures are generally gravelly silt loam (most common) or silt loam. Coarse fragment content, consisting of slaty gravels, varies from 10 to 50%. Surface horizons are often coarse-fragment-free. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoils. Soil colour is usually grayish brown, similar to the local bedrock. Mottles, when present, occur at depth and are usually light yellowish brown. Most Fadeway soils have either weak, or no soil development due to periodic flooding and surface additions of new material. A thin rhizomull layer consisting of plant litter overlying up to 4 cm of organic matter enriched, mildly alkaline to neutral mineral material (AhK) is usually present at the soil surface. They overlie mildly alkaline to neutral subsurface horizons (Ck). The usual classification is **Cumulic Regosol; calcareous phase,** although Orthic Regosol; calcareous phase is also common.

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
FD1	Cumulic Regosol; calcareous phase	moderately well			Consists dominantly of the most common soil as described above.
FD3	Cumulic Regosol; calcareous phase	moderately well	Gleyed Cumulic Regosol; calcareous phase	imperfect to poor	Less common soil contains fluctuating or permanently high water tables. It has mottled subsoil horizons (Cgjk) and usually occupies depressional areas in the floodplain landscape.
FD10	Cumulic Regosol; calcareous phase	moderately well	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Less common soils have strongly gleyed mineral soil horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

* FADEWAY Soil Association - FD (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FD11	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Cumulic Regosol; calcareous phase	moderately well	Most common soils have strongly gleyed mineral soil horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. Less common soil is as described for Fadeway soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* FENWICK Soil Association - FP

Fenwick soils occur in the White and Kootenay river drainages of the Rocky Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in silty sandy fans or veneers which overlie gravelly fluvioglacial or fluvial terrace (Plates 3.3, 3.6). The soil parent materials have been derived from areas of phyllite, limestone and dolomite. Slopes usually vary between 2 and 15%, while elevations range from 1350 to 1800 m asl.

Fenwick soils are mostly moderately well drained and moderately to slowly pervious. Textures range from silt loam (most common) to fine sandy loam in the surface horizons, while the subsurface clay accumulation horizon is usually silty clay loam. The subsoil fluvioglacial and fluvial materials vary from very gravelly loam to very gravelly loamy sand and contain between 50 and 80% coarse fragments, mostly rounded or slaty gravels, and some cobbles. A fibrimor forest floor layer up to 6 cm thick usually overlies up to 5 cm of light gray, leached mineral material (Ae). This is underlain by a 15 to 25 cm thick, light yellowish brown, extremely acid, very friable soil horizon (Bm) which, in turn, is underlain by a 10 to 15 cm thick slightly acid, stong angular blocky clay accumulation horizon (Bt). Mildly alkaline parent material, resembling the clay accumulation horizon, occurs at depths below 45 cm (Ck). The gravelly subsoil is usually encountered at about 80 to 120 cm. The usual classification is **Brunisolic Grey Luvisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FP1	Brunisolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
FP2	Brunisolic Gray Luvisol	moderately well	Orthic Gray Luvisol	well	Less common soil occurs in climatically or edaphically drier locations. It is less intensively leached and weathered (lacks a Bm horizon) and is equivalent to the Madias 1 soil association component.
FP3	Brunisolic Gray Luvisol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil occurs in climatically or edaphically wetter locations. It has a yellowish-brown, podzolized Bf horizon, indicating more intense weathering and leaching, and is equivalent to the George 1 soil association component.
FP4	Brunisolic Gray Luvisol	moderately well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	well to moderately well	Less common soils lack a clay accumulation horizon due to somewhat coarser textures. Some are strongly podzolized.

* FENWICK Soil Association - FP (Continued)

Soil Assoc. Component	Most Common Soil Classification	 Drainage	Less Common Soil Classification	 Drainage	Comments
FP7	Brunisolic Gray Luvisol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance and/or deposition.
FP8	Brunisolic Gray Luvisol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur in avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

FERSTER Soil Association - FE

Ferster soils occur in the Fernie and Flathead basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly sandy floodplain deposits derived from areas of mixed limestone, dolomite, sandstone, shale and coal (Plates 4.10, 4.14). Slopes are usually <2% and elevations range from 1800 to 2300 m asl.

Ferster soils are mostly imperfectly drained and moderately to rapidly pervious. Textures range from loam to gravelly loamy sand, although sandy loam is most common. Coarse fragments usually consist of <20% rounded gravels and a few cobbles in the surface horizons and between 40 and 70% in the subsoil. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. Soil colours are comparatively dark (e.g. very dark grayish brown) due to the dark colour of the soil parent material. Mottles are not easily visible.

Most Ferster soils have either weak, or no soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 10 cm thick consisting of plant litter overlying a thin organic matter enriched, mildly alkaline surface horizon (Ahk) is usually present at the soil surface. They overlie weakly gleyed, mildly alkaline subsurface horizons (Cgjk). The usual classification is **Gleyed Cumulic Regosol; calcareous phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FE1	Gleyed Cumulic Regosol; calcareous phase	imperfect			Consists dominantly of the most common soil as described above.
FE2	Gleyed Cumulic Regosol; calcareous phase	imperfect	Cumulic Regosol; calcareous phase	moderately well	Less common soil occupies higher lying, better drained areas than the most common soils. It is equivalent to the Fox Lake 1 soil association component.
FE10	Gleyed Cumulic Regosol; calcareous phase	imperfect	Rego Gleysol; calcareous phase, Terric Mesisol	poor to very poor	Less common soils have strongly gleyed mineral horizons (Cgk) and may have surface organic horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

FERSTER Soil Association - FE (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FE11	Rego Gleysol; calcareous phase, Terric Mesisol	poor to very poor	Gleyed Cumulic Regosol; calcareous phase	imperfect	Most common soils have strongly gleyed mineral horizons (Cgk) and also may have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Ferster soils.

The Ferster soil association was not described in detail or sampled for physical and chemical analyses. A soil with similar morphology that was described, sampled and analyzed is the Fox Lake association.

FESTUBERT Soil Association - FV

Festubert soils occur throughout the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly sandy floodplain deposits derived from areas of predominantly limestone and dolomite (Figure 3.2; Plate 4.8). Slopes are usually <2% and elevations range between 1800 and 2300 m asl.

Festubert soils are mostly imperfectly drained and rapidly pervious. Textures vary from gravelly loam to very gravelly sand, although gravelly sandy loam is most common. Coarse fragments contents usually range between 30 and 70%, and consist of rounded gravels and some cobbles. Occasionally, surface horizons are coarse-fragment-free. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoils. The usual soil colour is gray and mottles, occurring at depth, are dark yellowish brown.

Most Festubert soils have either weak, or no soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 10 cm thick consisting of plant litter overlying a thin, organic matter enriched neutral to moderately alkaline surface horizon (Ahk) is usually present at the soil surface. They overlie weakly gleyed, neutral to moderately alkaline subsoil horizons (Cgjk). The usual classification is **Gleyed Cumulic Regosol; calcareous phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FV1	Gleyed Cumulic Regosol; calcareous phase	imperfect			Consists dominantly of the most common soil as described above.
FV2	Gleyed Cumulic Regosol; calcareous phase	imperfect	Cumulic Regosol; calcareous phase	moderately well	Less common soil occupies the higher lying positions in the floodplain landscape. It is equivalent to the Four Points 1 soil association component.
FV10	Gleyed Cumulic Regosol; calcareous phase	imperfect	Rego Gleysol; calcareous phase, Terric Mesisol	poor to very poor	Less common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

FESTUBERT Soil Association - FV (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FV11	Rego Gleysol; calcareous phase, Terric Mesisol	poor to very poor	Gleyed Cumulic Regosol; calcareous phase	imperfect	The most common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Festubert soils.

The Festubert soil association was not described in detail or sampled for physical and chemical analysis. A soil with similar morphology that was described, sampled and analyzed is the Four Points association.

FIRE MOUNTAIN Soil Association - FJ

Fire Mountain soils occur in the White and Kootenay river drainages of the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in silty gravelly floodplain deposits derived from areas characterized by phyllite, limestone and dolomite (Figure 3.5). Slopes are usually <2%, while elevations range from 1800 to 2300 m asl.

Fire Mountain soils are mostly imperfectly drained and moderately pervious. Textures are generally gravelly silt loam (most common) or silt loam. Coarse fragment content, varying from 20 to 50%, consists mostly of slaty gravels. Surface horizons may occasionally be coarse-fragment-free. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. Mottles usually occur at depth and are yellowish-brown.

Most Fire Mountain soils have only little, or no soil development due to periodic flooding and surface additions of new material. A thin rhizomull layer consisting of plant litter overlying up to 4 cm of organic matter enriched, mildly alkaline to neutral material (Ahk), are usually present at the soil surface. They overlie weakly gleyed, mildly alkaline to neutral subsurface horizons (Cgjk). The usual classification is **Gleyed Cumulic Regosol; calcareous phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FJ1	Gleyed Cumulic Regosol; calcareous phase	imperfect			Consists dominantly of the most common soil as described above.
FJ2	Gleyed Cumulic Regosol; calcareous phase	imperfect	Cumulic Regosol; calcareous phase	moderately well	Less common soil occupies the higher lying positions in the floodplain landscape. It is equivalent to the Fadeway 1 soil association component.
FJ10	Gleyed Cumulic Regosol; calcareous phase	imperfect	Rego Gleysol; calcareous phase, Terric Mesisol	poor to very poor	Less common soils have strongly gleyed mineral horizons (Cgk) and also may have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

FIRE MOUNTAIN Soil Association - FJ (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FJ11	Rego Gleysol; calcareous phase, Terric Mesisol	poor to very poor	Gleyed Cumulic Regosol; calcareous phase	imperfect	Most common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Fire Mountain soils.

The Fire Mountain soil association was not described in detail or sampled for physical and chemical analysis. A soil with similar morphology that was described, sampled and analyzed is the Fadeway soil association.

* FIREWEED Soil Association - FF

Fireweed soils occur throughout the Rocky Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in gravelly sandy floodplain deposits derived from areas of limestone and dolomite (Plate 4.19). Slopes are usually <2%, while elevations range from 1050 to 1350 m asl.

Fireweed soils are generally moderately well drained and rapidly pervious. Textures range from gravelly loam to very gravelly loamy sand, although gravelly sandy loam is most common. Coarse fragment content usually varies from 30 to 70% and consists of rounded gravels and cobbles. Surface horizons may sometimes be coarse-fragment-free. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. The usual soil colour is grayish-brown; mottles, when present, are at depth and strong brown in colour.

Most Fireweed soils have either little, or no soil development due to periodic flooding and surface additions of new material. After flooding these soils drain relatively rapidly since they stand comparatively high in the fluvial landscape. A rhizomull layer up to 6 cm thick and consisting of plant litter overlies a thin, organic matter enriched, neutral to mildly alkaline surface horizon (Ahk) at the soil surface. They overlie neutral to mildly alkaline subsurface horizons (Ck). The usual classification is **Cumulic Regosol; calcareous phase.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
FF1	Cumulic Regosol; calcareous phase	moderately well			Consists dominantly of the most common soil as described above.
FF3	Cumulic Regosol; calcareous phase	moderately well	Gleyed Cumulic Regosol; calcareous phase	imperfect to poor	Less common soil has weakly gleyed subsurface horizons (Cgjk) due to fluctuating or permanently high water tables. It usually occupies lower lying areas in the floodplain landscape.
FF10	Cumulic Regosol; calcareous phase	moderately well	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Less common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

* FIREWEED Soil Association - FF (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
FF11	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Cumulic Regosol; calcareous phase	moderately well	Most common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Fireweed soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* FISHERTOWN Soil Association - FX

Fishertown soils occur on the floor of the Rocky Mountain Trench, within the Ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed under open forests and grassland on gravelly fluvioglacial outwash plains, terraces and fans derived from predominantly limestone and dolomite areas (Plate 3.2). Slopes are usually gentle, but a few range up to 30%, while elevations vary between 700 and 1050 m asl.

Fishertown soils are rapidly drained and rapidly pervious. Textures range from very gravelly silt loam to very gravelly loamy sand, although gravelly sandy loam is most common. Coarse fragment content is high in all horizons - up to 80% - and consists mainly of rounded gravels and cobbles. A thin, raw moder consisting of forest litter and up to 4 cm of organic matter enriched mineral material (Ah) are present at the soil surface. These overlie a solum which is between 20 to 30 cm thick, pale brown, and slightly acid to mildly alkaline (Bm, Bmk, BCk). Carbonate cemented, moderately alkaline subsoil horizons (Ck, Cca) characterized by white carbonate coatings on the undersides of coarse fragments, extend from the base of the solum to depths of 1 m or more. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	 Drainage	Less Common Soil Classification	 Drainage	Comments
FX1	Orthic Eutric Brunisol	rapid			Consists dominantly of the most common soil as described above.
FX2	Orthic Eutric Brunisol	rapid	Orthic Dark Brown, Calcerecareous Dark Brown	rapid	Less common soils have developed under grassy vegetation and have well developed, organic matter enriched surface (Ah) horizons. Some may be mildly alkaline to the surface (Ahk). They are equivalent to the soils of the Saha 10 soil association component.
FX9	Orthic Eutric Brunisol	rapid	Orthic Eutric Brunisol; calcareous phase	rapid	Less common soil is mildly alkaline to the surface (Bmk), but otherwise resembles the most common soil described above.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* FLAGSTONE Soil Association - F

Flagstone soils occur on the floor of the Rocky Mountain Trench, within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in sandy fluvioglacial and glaciolaustrine beach deposits that have been reworked by aeolian processes in some areas. Slopes usually vary between 9 and 30%, while elevations range between 700 and 1050 m asl.

Flagstone soils are rapidly drained and rapidly pervious. Soil textures vary from sand to fine sandy loam; loamy sand is most common. Coarse fragments are not usually present. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface and overlies a 20 to 30 cm thick solum (Bm, Bmk, BCk) that is pale brown and slightly acid to mildly alkaline. Subsoils are mildly to moderately alkaline and carbonate cemented (Cck). The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
F1	Orthic Eutric Brunisol	rapid			Consists dominantly of the most common soil as described above.
F2	Orthic Eutric Brunisol	rapid	Orthic Dark Brown, Calcareous Dark Brown	rapid	Less common soils have developed under grassy vegetation and have well developed, organic matter enriched surface horizons (Ah) and may be mildly to moderately alkaline to the surface (Ahk).
F9	Orthic Eutric Brunisol	rapid	Orthic Eutric Brunisol; calcareous phase	rapid	Less common soil is mildly to moderately alkaline to the surface (Bmk), but otherwise resembles the most common soil described above.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* FLATBOW Soil Association - FL

Flatbow soils are relatively common in the moister areas of the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone in the Rocky Mountain Trench. They have developed in gravelly silty morainal materials (till) located on the floor and lower valley sides (Plate 3.1). The till is generally >1 m deep and derived from areas of calcareous bedrocks. Slopes vary between 10 and 60%, while elevations range from 1050 to 1350 m asl.

Flatbow soils are mostly well drained and moderately to slowly pervious. Texture is usually silt loam or gravelly silt loam, but locally, may be very gravelly. Coarse fragment contents range between 20 and 60% and consist of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs on the soil surface and overlies a 5 to 25 cm thick, light yellowish brown (dry), medium to slightly acid horizon (Bm). This horizon is underlain by a 15 to 30 cm thick, strong angular blocky, clay accumulation horizon (Bt), which grades to mildly or moderately alkaline parent material (Cca, Ck) at about 60 cm depth. The parent material is characterized by accumulations of white carbonates on the undersides of coarse fragments. The usual classification is **Brunisolic Gray Luvisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FL1	Brunisolic Gray Luvisol	well			Consists dominantly of the most common soil described above.
FL2	Brunisolic Gray Luvisol	well	Orthic Gray Luvisol	well	Less common soil occurs in climatically or edaphically drier locations. It is characterized by a pale brown (dry), leached surface horizon (Ae) and is equivalent to the Kinbasket 1 soil association component.
FL3	Brunisolic Gray Luvisol	well	Podzolic Gray Luvisol	well to moderately well	Less common soil occurs in climatically or edaphically wetter locations, and has a yellowish-brown (dry), podzolized (Bf) upper horizon. It is equivalent to the McKay Mountain 1 soil association component.
FL4	Brunisolic Gray Luvisol	well	Orthic Eutric Brunisol	well	Less common soil lacks a clay accumulation horizon due to slightly coarser textures. It is equivalent to the Spillimacheen 1 soil association component.
FL5	Brunisolic Gray Luvisol	well	Brunisolic Gray Luvisol; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.

* FLATBOW Soil Association - FL (Continued)

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FL7	Brunisolic Gray Luvisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

FLETCHER Soil Association - FR

Fletcher soils occur in the drier portions of the Purcell Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine - western larch subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in gravelly fans derived from primarily non-calcareous bedrock areas. Slopes vary between 2 and 15%, while elevations range from 1200 to 1350 m asl.

Fletcher soils are generally moderately well to well drained and moderately to rapidly pervious. Textures are variable, ranging from silt loam to gravelly sand, due to the various depositional and erosional forces that have affected the fans. The most common texture, however, is gravelly sandy loam. Coarse fragment content in the subsoil ranges from 50 to 70% and consists of rounded gravels and cobbles; contents are often much less in the surface. A fibrimor forest floor layer up to 6 cm thick occurs at the soil surface. It is underlain by a light yellowish brown, very strongly acid solum (Bm, BC), that is between 40 and 80 cm thick. Relatively unweathered parent material (C) occurs below this depth. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FR1	Orthic Dystric Brunisol	moderately well to well			Consists dominantly of the most common soil as described above.
FR2	Orthic Dystric Brunisol	moderately well to well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations or on more basic parent material. It has a medium acid, shallower solum and is equivalent to the Glencairn 1 soil association component.
FR3	Orthic Dystric Brunisol	moderately well to well	Orthic Humo-Ferric Podzol	moderately well to well	Less common soil occurs in climatically or edaphically wetter locations and has a yellowish-brown, strongly to extremely acid, strongly podzolized, upper solum (Bf).
FR4	Orthic Dystric Brunisol	moderately well to well	Brunisolic Gray Luvisol	moderately well	Less common soil contains a clay accumulation (Bt) horizon due to somewhat finer textures.
FR7	Orthic Dystric Brunisol	moderately well to well	Orthic Regosol	moderately well to well	Less common soil lacks soil development due to recent disturbance or deposition.

FLETCHER Soil Association - FR (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FR10	Orthic Dystric Brunisol	moderately well to well	Cumulic Regosol, Gleyed Cumulic Regosol	moderately well to imperfect	Less common soils occupy the active channel portions of the fans and lack soil development.

The Fletcher soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled, and analyzed is the Fruitvale soil association.

* FOLLOCK Soil Association - FA

Follock soils occur in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir-lodgepole pine subzone of the Subalpine Engelmann Spruce - alpine fir Forest Zone. They have developed in gravelly sandy floodplain deposits derived from areas of predominantly non-calcareous sandstone, siltstone, argillite, shale and coal (Figure 3.8). Slopes are usually <2%, while elevations range from 1350 to 1800 m asl.

Follock soils are mostly moderately well drained and rapidly pervious. Textures vary from gravelly loam to very gravelly sand; gravelly sandy loam is most common, however. Coarse fragment contents range between 20 and 80% and consist of rounded gravels with lesser cobbles. Coarse-fragment-free surface horizons sometimes occur. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. Soil colours are dark (eg. dark yellowish-brown) due to the dark colour of the soil parent material. Mottles are not usually evident.

Follock soils have either weak or insignificant soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 6 cm thick consisting of plant litter overlying a thin, organic matter enriched surface horizon (Ah) is usually present at the soil surface. These overlie slightly to very strongly acid subsurface horizon (C). The usual classification is Cumulic Regosol.

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FA1	Cumulic Regosol	moderately well			Consists dominantly of the most common soil as described above.
FA3	Cumulic Regosol	moderately well	Gleyed Cumulic Regosol	imperfect to poor	Less common soil has gleyed subsurface horizons (Cgj) due to periodically high water tables. It usually occupies lower lying areas in the floodplain landscape and is equivalent to the most common soil of Font Creek 1 soil association component.
FA10	Cumulic Regosol	moderately well	Rego Gleysol, Terric Mesisol	very poor to poor	Less common soils have strongly gleyed mineral horizons (Cg) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

* FOLLOCK Soil Association - FA (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FA11	Rego Gleysol, Terric Mesisol	very poor to poor	Cumulic Regosol	moderately well	Most common soils have strongly gleyed mineral horizons (Cg) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Follock soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

FONT CREEK Soil Association - FK

Font Creek soils occur in the Fernie and Flathead basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly sandy floodplain deposits derived from areas where non-calcareous sandstone, siltstone, argillite, shale and coal predominate. Slopes are usually <2%, while elevations range from 1800 to 2300 m asl.

Font Creek soils are mostly imperfectly drained and rapidly pervious. Textures are variable and range from loam to very gravelly loamy sand. Gravelly sandy loam predominates, however. Coarse fragment contents are also variable, ranging between 10 and 80%, and consist mainly of rounded gravels with lesser cobbles. Coarse-fragment-free surface horizons sometimes occur. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. Soil colours are comparatively dark (eg. dark yellowish brown) due to the dark soil parent material colours. Mottles are not usually easily evident.

Most Font Creek soils have either weak or insignificant soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 8 cm thick consisting of plant litter and a thin, organic enriched mineral horizon (Ah) are usually present at the soil surface. They overlie weakly gleyed, slightly to strongly acid subsurface horizons (Cgj). The usual classification is **Gleyed Cumulic Regosol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FK1	Gleyed Cumulic Regosol	imperfect			Consists dominantly of the most common soil as described above.
FK2	Gleyed Cumulic Regosol	imperfect	Cumulic Regosol	moderately well	Less common soil occupies higher lying, better drained areas in the floodplain landscape. It is equivalent to the Follock 1 soil association component.
FK10	Gleyed Cumulic Regosol	imperfect	Rego Gleysol, Terric Mesisol	poor to very poor	Less common soils have strongly gleyed mineral horizons (Cg) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

FONT CREEK Soil Association - FK (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FK11	Rego Gleysol, Terric Mesisol	poor to very poor	Gleyed Cumulic Regosol	imperfect	Most common soils have strongly gleyed mineral horizons (Cg) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Font Creek soils.

The Font Creek soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled, and analyzed is the Follock soil association.

* FORT STEELE Soil Association - FS

Fort Steele soils occur on the floor of the Rocky Mountain Trench, within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in gravelly sandy floodplain deposits derived from areas of predominantly limestone and dolomite (Plate 3.2). Slopes are usually <2%, while elevations range between 700 and 900 m asl.

Fort Steele soils are generally moderately well drained, and rapidly pervious. Textures are variable and range from gravelly loam to very gravelly loamy sand. Gravelly sandy loam predominates, however. Coarse fragment contents vary between 30 and 70% and consist mostly of rounded gravels, with lesser cobbles. Surface horizons are occasionally coarse-fragment-free. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. The usual solum colour is light gray; mottles, if present, are at depth and are usually strong brown.

Most Fort Steele soils have insignificant soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 4 cm thick consisting of plant litter and a thin, mildly alkaline, organic matter enriched horizon (Ahk) are usually present at the soil surface. They overlie mildly alkaline subsurface horizons (Ck). The usual classification is **Cumulic Regosol; calcareous phase.**

Soil Assoc. Component	Most Common Soil Classification	 Drainage	Less Common Soil Classification	 Drainage	Comments
FS1	Cumulic Regosol; calcareous phase	moderately well			Consists dominantly of the most common soil as described above.
FS3	Cumulic Regosol; calcareous phase	moderately well	Gleyed Cumulic Regosol; calcareous phase	imperfect to poor	Less common soil has weakly gleyed subsurface horizons (Cgjk) due to fluctuating or permanently high water tables. It usually occupies the lower lying areas in the floodplain landscape.
FS10	Cumulic Regosol; calcareous phase	moderately well	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Less common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

* FORT STEELE Soil Association - FS (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FS11	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Cumulic Regosol; calcareous phase	moderately well	Most common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Fort Steele soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

FORUM MOUNTAIN Soil Association - FQ

Forum Mountain soils occur in the Fernie and Flathead basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in clayey silty to gravelly sandy floodplain deposits derived from areas of predominantly non-calcareous shale (Figure 3.3). Slopes are usually <2%, while elevations range between 1800 and 2300 m asl.

Forum Mountain soils are mostly imperfectly drained and slowly to moderately pervious. Textures are mainly silty clay loam or gravelly silty clay loam in the upper soil, but locally, may be as coarse as gravelly sandy loam. Subsoils are usually somewhat coarser. Coarse fragment content is usually <40% and consists of shaly gravels. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. Soil colours are comparatively dark (eg. very dark brown) due to dark soil parent material colours. Mottles are not readily evident.

Most Forum Mountain soils have insignificant soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 4 cm thick consisting of plant litter and a thin, organic matter enriched mineral horizon (Ah) are usually present at the soil surface. They overlie weakly gleyed, medium acid to neutral subsurface horizons (Cgj). The usual classification is **Gleyed Cumulic Regosol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FQ1	Gleyed Cumulic Regosol	imperfect			Consists dominantly of the most common soil as described above.
FQ2	Gleyed Cumulic Regosol	imperfect	Cumulic Regosol	moderately well	Less common soil occupies the higher lying, better drained areas in the floodplain landscape. It is equivalent to the Frayn Mountain 1 soil association component.
FQ10	Gleyed Cumulic Regosol	imperfect	Rego Gleysol, Terric Mesisol	poor to very poor	Less common soils have strongly gleyed mineral horizons (Cg) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

FORUM MOUNTAIN Soil Association - FQ (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
FQ11	Rego Gleysol, Terric Mesisol	poor to very poor	Gleyed Cumulic Regosol	imperfect	Most common soils have strongly gleyed mineral horizons (Cg) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Forum Mountain soils.

Forum Mountain soils were not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Frayn Mountain association.

* FOUR POINTS Soil Association - FU

Four Points soils occur throughout the Rocky Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly sandy floodplain deposits derived from areas where limestone and dolomite predominate (Plates 4.5, 4.7). Slopes are usually <2%, while elevations range between 1350 and 1800 m asl.

Four Points soils are mostly moderately well drained and rapidly pervious. Textures range from gravelly loam to very gravelly sand; very gravelly sandy loam predominates, however. Coarse fragment contents, varying between 40 and 70%, consist mainly of rounded gravels, with lesser cobbles. Some surface horizons may be coarse-fragment-free. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. The usual solum colour is gray; mottles, when present, are dark yellowish brown.

Most Four Points soils have insignificant soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 10 cm thick consisting of plant litter and a thin, organic matter enriched, mildly alkaline to neutral mineral horizon (Ahk) are usually present at the soil surface. They overlie mildly alkaline to neutral subsurface horizons (Ck). The usual classification is **Cumulic Regosol; calcareous phase.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
FU1	Cumulic Regosol; calcareous phase	moderately well			Consists dominantly of the most common soil as described above.
FU3	Cumulic Regosol; calcareous phase	moderately well	Gleyed Cumulic Regosol; calcareous phase	imperfect to poor	Less common soil has weakly gleyed subsurface horizons (Cgjk) due to fluctuating or permanently high water tables. It usually occupies moderately depressional areas in the floodplain landscape.
FU10	Cumulic Regosol; calcareous phase	moderately well	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Less common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest lying, wettest positions in the floodplain landscape.

* FOUR POINTS Soil Association - FU (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FU11	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Cumulic Regosol; calcareous phase	moderately well	Most common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest lying, wettest positions in the floodplain landscape. The less common soil is as described for Four Points soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

Plate 4.7 Soils in the Palliser River valley, Rocky Mountains (see text for explanation of symbols).

Plate 4.8 Soils in the Elk River valley, near Forsyth Creek (see text for explanation of symbols).

* FOX LAKE Soil Association - FZ

Fox Lake soils occur in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann Spruce - alpine fir Forest Zone. They have developed in gravelly sandy floodplain deposits derived from areas characterized by limestone, dolomite, sandstone, shale and coal (Plates 3.5, 4.8). Slopes are usually <2% and elevations range from 1350 to 1800 m asl.

Fox Lake soils are mostly moderately well drained and moderately to rapidly pervious. Textures range from gravelly loam or loam to very gravelly loamy sand; sandy loam surface and gravelly sandy loam subsoils are most common, however. Coarse fragment contents vary from 20 to 80% and consist mainly of rounded gravels, with lesser cobbles. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil. Soil colours are comparatively dark (eg. very dark grayish brown) due to dark soil parent materials. Mottles are not usually evident.

Most Fox Lake soils have insignificant soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 8 cm thick consisting of plant litter and a thin, organic matter enriched, mildly alkaline mineral horizon (Ahk) are usually present at the soil surface. Under these is mildly alkaline soil parent material (Ck). The usual classification is **Cumulic Regosol; calcareous phase.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
FZ1	Cumulic Regosol; calcareous phase	moderately well			Consists dominantly of the most common soil as described above.
FZ3	Cumulic Regosol; calcareous phase	moderately well	Gleyed Cumulic Regosol; calcareous phase	imperfect to poor	Less common soil has weakly gleyed subsurface horizons (Cgjk) due to fluctuating or permanently high water tables. It usually occupies the moderately depressional areas in the floodplain landscape.
FZ10	Cumulic Regosol; calcareous phase	moderately well	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Less common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest lying, wettest portions of the floodplain landscape.

* FOX LAKE Soil Association - FZ (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FZ11	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Cumulic Regosol; calcareous phase	moderately well	Most common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest lying, wettest positions in the floodplain landscape. The less common soil is as described for Fox Lake soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* FRAYN MOUNTAIN Soil Association - FM

Frayn Mountain soils occur in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in clayey silty to gravelly sandy floodplain deposits derived from areas of predominantly non-calcareous shale (Plate 4.9). Slopes are usually <2%, while elevations range from 1350 to 1800 m asl.

Frayn Mountain soils are generally moderately well drained and slowly to moderately pervious. Textures are usually silty clay loam or gravelly silty clay loam, but locally may vary to gravelly sandy loam. Coarse fragment content is usually <40%, and consists mainly of shaly gravels. Layers and lenses of varying thickness and textures, often organic matter enriched, are common in the subsoil. The soil is usually very dark brown in colour, a reflection of the dark coloured soil parent material. Mottles are usually not evident.

Most Frayn Mountain soils have insignificant soil development due to periodic flooding and surface additions of new material. A rhizomull layer up to 4 cm thick consisting of plant litter and a thin, organic matter enriched mineral horizon (Ah) are usually present at the soil surface. These overlie medium acid to neutral soil parent material (C). The usual classification is **Cumulic regosol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FM1	Cumulic Regosol	moderately well			Consists dominantly of the most common soil as described above.
FM3	Cumulic Regosol	moderately well	Gleyed Cumulic Regosol	imperfect to poor	Less common soil has weakly gleyed subsurface horizons (Cgj) due to fluctuating or permanently high water tables. It usually occupies lower lying areas in the floodplain landscape.
FM9	Cumulic Regosol	moderately well	Cumulic Regosol; calcareous phase	moderately well	Less common soil is calcareous due to the localized influence of calcareous bedrocks.
FM10	Cumulic Regosol	moderately well	Rego Gleysol, Terric Mesisol	very poor to poor	Less common soils have strongly gleyed mineral horizons (Cg) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

* FRAYN MOUNTAIN Soil Association - FM (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FM11	Rego Gleysol, Terric Mesisol	very poor to poor	Cumulic Regosol	moderately well	The most common soils have strongly gleyed mineral horizons (Cg) and may also have organic surface horizons (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Frayn Mountain soils.

* A detailed soils profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* FRONTAL Soil Association - FO

Frontal soils occur in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in clayey silty fans or veneers overlying gravelly fluvioglacial or fluvial terraces (Plate 4.9). The parent materials are mainly derived from areas of dark coloured, acidic shale. Slopes usually range between 2 and 15%, while elevations vary from 1350 to 1800 m asl.

Frontal soils are mostly moderately well drained and moderately to slowly pervious. Textures are silty clay loam (most common) or clay loam in the upper soil and vary between gravelly loam and very gravelly loamy sand in the subsoil. Coarse fragment content in the upper part of the soil is usually <20% and consists of shaly gravels. Contents in the subsoil increase to between 40 and 80% and consist of rounded gravels and cobbles. A fibrimor forest floor layer up to 6 cm thick usually overlies a <5 cm thick, light gray, leached horizon (Ae) at the soil surface. This is underlain by a 10 to 20 cm thick, very pale brown (dry), extremely to slightly acid, very friable horizon (Bm) that grades into a 25 to 35 cm thick, brown, strong angular blocky clay accumulation horizon (Bt). Medium to slightly acid parent material (C), resembling the clay accumulation zone, occurs at depths below 60 cm. The gravelly subsoil (IIC) is encountered at about 100 cm depth. The usual classification is **Brunisolic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
F01	Brunisolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
F02	Brunisolic Gray Luvisol	moderately well	Orthic Gray Luvisol	well	Less common soil occurs in climatically or edaphically drier locations. It is less intensely leached and weathered and is equivalent to the Cadorna 1 soil association component.
F03	Brunisolic Gray Luvisol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil occurs in climatically or edaphically wetter locations. It has a yellowish-brown, moderately podzolized surface horizon (Bf).
F04	Brunisolic Gray Luvisol	moderately well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	moderately well	Less common soils lack subsurface clay accumulation horizons due to somewhat coarser textures. Some are strongly podzolized.
F07	Brunisolic Gray Luvisol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance (erosion or deposition).

* FRONTAL Soil Association - FO (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
F08	Brunisolic Gray Luvisol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons but otherwise are weakly developed due to recent erosion and/or deposition.
F09	Brunisolic Gray Luvisol	moderately well	Orthic Eutric Brunisol	well	Less common soil lacks a clay accumulation horizon, and has a neutral to medium acid solum. The parent material is mildly to moderately alkaline.

* A detailed soil profile description, together with physical and chemical anaylses, is available in the B.C. Soil Information System.

Plate 4.9 Soils in the Harvey Pass area, Flathead Basin (see text for explanation of symbols).

* FRUITVALE Soil Association - FT

Fruitvale soils occur in the wetter parts of the Purcell Mountains, within the lodgepole pine-Engelmann spruce - alpine fir subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in gravelly fans composed of materials derived from areas of non-calcareous bedrocks (Figure 3.6). Slopes usually vary between 2 and 15% and elevations range from 1200 to 1350 m asl.

Fruitvale soils are generally moderately well to well drained and moderately to rapidly pervious. Textures are variable and range from silt loam to gravelly sand; gravelly sandy loam is most common, however. Coarse fragment contents range from 50 to 70% in the subsoil and consist of rounded gravels and cobbles; contents in the upper horizons are usually much less. A fibrimor forest floor layer up to 6 cm thick occurs at the soil surface. It is underlain by a 40 to 80 cm thick solum (Bm, BC) that is yellowish-brown and very strongly acid. Relatively unweathered parent material (IIC) occurs below these depths. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
FT1	Orthic Dystric Brunisol	moderately well to well			Consists dominantly of the most common soil as described above.
FT2	Orthic Dystric Brunisol	moderately well to well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations and has a shallower, medium acid, light yellowish brown solum. It is equivalent to the Glencairn 1 soil association component.
FT3	Orthic Dystric Brunisol	moderately well to well	Orthic Humo-Ferric Podzol	moderately well to well	Less common soil occurs in climatically or edaphically wetter locations and has a strongly podzolized, strongly to extremely acid upper solum (Bf).
FT7	Orthic Dystric Brunisol	moderately well to well	Orthic Regosol	moderately well to well	Less common soil lacks soil development due to recent disturbance or deposition.
FT8	Orthic Dystric Brunisol	moderately well to well	Cumulic Humic Regosol, Orthic Regosol	moderately well to well	Less common soils occur on avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

* FRUITVALE Soil Association - FT (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
FT10	Orthic Dystric Brunisol	moderately well to well	Cumulic Regosol, Gleyed Cumulic Regosol	moderately well to imperfect	Less common soils occur in active channel portions of the fans and lack soil development (other than thin organic matter enriched bands in the subsoil).

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* GAGNEBIN Soil Association - GB

Gagnebin soils occur throughout the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine - Engelmann spruce - alpine fir Forest Zone. They have developed in silty sandy fluvial or aeolian veneers overlying gravelly fluvioglacial outwash plains, terraces and fans derived from areas of limestone and dolomite (Plate 3.3, 4.5, 4.7). Slopes range between 5 and 30%, while elevations vary from 1350 to 1800 m asl.

Gagnebin soils are generally well drained and are moderately pervious. Textures range from silt loam (most common) to fine sandy loam in the surface and subsurface horizons and from very gravelly loam to very gravelly loamy sand in the fluvioglacial subsoil. Coarse fragment contents in the subsoil vary from 50 to 80% and consist of rounded gravels and cobbles. A fibrimor forest floor layer up to 6 cm thick is present at the soil surface and overlies an intermittant, <5 cm thick, pale brown, leached layer (Ae). Under this is a 20 to 50 cm thick, yellowish-brown, slightly acid to mildly alkaline solum (Bm, Bmk, BCk). Carbonate cemented, mildly alkaline subsoil horizons (IICca, IICk) characterized by white coatings on the undersides of coarse fragments extends from about 50 cm to depths that may exceed 1 m. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
GB1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
GB2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol, Orthic Eutric Brunisol; calcareous phase	well to rapid	Less common soils have developed under grassy vegetation and have a well developed, organic matter enriched surface horizon (Ah), or are mildly alkaline to the surface. They occupy climatically or edaphically drier locations.
GB3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	well to moderately well	Less common soils have strongly acid, weakly to moderately podzolized solums (Bm, Bf) grading to mildly alkaline with depth. They occupy climatically or edaphically wetter locations.
GB7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition and is mildly alkaline to the surface.

* GAGNEBIN Soil Association - GB (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GB8	Orthic Eutric Brunisol	well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occupy avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* GALTON Soil Association - GT

Galton soils occur in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly fluvioglacial terraces and fans composed of materials derived from areas of non-calcareous sandstone, siltstone, argillite, shale and coal (Figure 3.8; Plates 3.5, 4.1). Slopes usually vary between 5 and 30% and elevations range from 1350 to 1800 m asl.

Galton soils are mostly well drained and rapidly pervious. Textures range between very gravelly loam and very gravelly loamy sand, with very gravelly sandy loam being most common. In a few areas, a thin silt loam to fine sandy loam fluvial or aeolian veneer may be present at the soil surface. Coarse fragment contents usually range between 60 and 90% and consist mostly of rounded gravels and cobbles. A fibrimor forest floor layer up to 6 cm thick is present at the soil surface and overlies an intermittent, <5 cm thick, grayish-brown, leached horizon (Ae). Under this is a 20 to 30 cm thick, yellowish-brown, strongly acid solum (Bm, BC). Relatively unweathered, dark brown, strongly acid parent material (C) begins at about 45 cm depth. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
GT1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
GT2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations and has a medium acid to neutral solum.
GT3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well to moderately well	Less common soil occurs in climatically or edaphically wetter locations. It has strongly acid, podzolized, upper horizons (Bf) and is equivalent to the Gold Creek 1 soil association component.
GT4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol, Podzolic Gray Luvisol	well to moderately well	Less common soils contain a subsurface clay accumulation layer (Bt) due to somewhat finer textures. In cooler wetter locations, the upper horizons may be podzolized (Bf).
GT7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

* GALTON Soil Association - GT (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GT8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

GEORGE Soil Association - GE

George soils occur in the White and Kootenay river drainages of the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in sandy silty fans or veneers overlying gravelly fluvioglacial or fluvial terraces (Figure 3.5), derived from areas of phyllite, limestone and dolomite. Slopes range up to 15%, while elevations vary between 1800 and 2300 m asl.

George soils are usually moderately well drained and moderately to slowly pervious. Textures in the surface horizons range between silt loam (most common) and fine sandy loam, while the subsurface clay accumulation horizon is usually silty clay loam. The underlying fluvioglacial deposits range from very gravelly loam to very gravelly loamy sand and contain 50 to 80% coarse fragments consisting of slaty and rounded gravels with lesser cobbles. A fibrimor forest floor layer up to 10 cm thick overlies a <5 cm thick, light grey, very friable, leached horizon (Ae1) at the soil surface. This is underlain by a 10 to 50 cm thick, strongly podzolized, yellowish-brown, extremely acid horizon (Bf) which grades (Bm, Ae2) to a 10 to 15 cm thick, strong angular blocky, clay accumulation horizon (Bt). Relatively unweathered, gravelly, alkaline glaciofluvial materials occur below depths of approximately 50 to 75 cm (IICk). The usual classification is **Podzolic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GE1	Podzolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
GE2	Podzolic Gray Luvisol	moderately well	Brunisolic Gray Luvisol	well	Less common soil lacks strongly podzolized horizons, is less acid and is less deeply weathered due to development in climatically or edaphically drier locations. It is equivalent to the Fenwick 1 soil association component.
GE3	Podzolic Gray Luvisol	moderately well	Luvisolic Humo-Ferric Podzol, Podzolic Gray Luvisol; ferro-humic phase	moderately well	Less common soils are either more deeply leached and weathered, or have organic matter enriched upper solums, (Bhf) due to development in climatically or edaphically wetter locations.
GE4	Podzolic Gray Luvisol	moderately well	Orthic Humo-Ferric Podzol	moderately well	Less common soil lacks a subsurface clay accumulation horizon due to somewhat coarser textures.

GEORGE Soil Association - GE (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GE7	Podzolic Gray Luvisol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition and is mildly alkaline to the surface.
GE8	Podzolic Gray Luvisol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

George soils were not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Fenwick soil association.

* GLENCAIRN Soil Association - GN

Glencairn soils are common on the floor of larger valleys leading from the Purcell Mountains into the Rocky Mountain Trench. They occur in the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. Their parent materials are sandy gravelly fluvioglacial outwash derived from areas of mixed calcareous and non-calcareous bedrock, and deposited as plains, terraces and fans (Plate 3.7). Slopes most commonly range between 5 and 30%, but are steeper on local escarpments, kame hummocks and kettles. Elevations range between 1050 and 1350 m asl.

Glencairn soils are well drained and rapidly to moderately pervious. Textures vary from gravelly loam to very gravelly loamy sand; gravelly sandy loam is most common, however. Coarse fragments consisting of gravels and cobbles, occupy between 10 and 50% of the upper soil and increase to between 40 and 70% in the subsoil. A fibrimor forest floor layer up to 5 cm thick occurs at the soil surface. It is underlain by a light yellowish-brown, medium acid solum (Bm, BC), usually between 20 and 50 cm thick. Relatively unweathered, slightly acid to neutral parent material (IIC) is encountered at depths between 30 and 60 cm. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
GN1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
GN2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol, Orthic Dark Brown	well	Less common soils occur in climatically or edaphically drier locations dominated by grassy vegetation. They have well developed, organic matter enriched surface horizons (Ah) and are equivalent to the Hyak 3 soil association component.
GN3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	well	Less common soils occur in climatically or edaphically wetter locations and have yellowish-brown, moderately to strongly podzolized, strongly to extremely acid solums (Bm, Bf). They are equivalent to the Kinert 3 soil association component.
GN4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a clay accumulation horizon (Bt) due to somewhat finer textures.

* GLENCAIRN Soil Association - GN (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GN10	Orthic Eutric Brunisol	well	Cumulic Regosol, Gleyed Cumulic Regosol	moderately well to imperfect	Less common soils have weak soil development due to recent deposition or erosion on floodplains.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

GLENLILY Soil Association - GY

Glenlily soils occur on the floors of larger valleys in the Purcell Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine - western larch subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in gravelly fluvioglacial outwash derived from areas of noncalcareous bedrocks and deposited as plains, terraces and fans. Slopes generally range between 5 and 30% but locally may be steeper. Elevations vary between 1200 and 1350 m asl.

Glenlily soils are well drained and rapidly to moderately pervious. Textures usually range between gravelly sandy loam (most common) and very gravelly sand. Coarse fragments, usually consisting of rounded gravels and cobbles, occupy between 40 and 70% of the subsoil, but are often substantially less at the surface. A fibrimor forest floor layer up to 5 cm thick occurs at the soil surface. It is underlain by a light yellowish brown, medium to very strongly acid solum (Bm, BC) extending to depths between 30 and 60 cm below which moderately to slightly acid parent material (C) begins. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
GY1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
GY2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations and has a medium acid, shallower solum. (Bm, BC). It is equivalent to the Glencairn 1 soil association component.
GY3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well to moderately well	Less common soil occurs in climatically or edaphically wetter locations and has a podzolized, yellowish-brown, strongly to extremely acid upper solum (Bf).
GY4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a clay accumulation horizon (Bt) due to somewhat finer soil textures.
GY7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

GLENLILY Soil Association - GY (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GY8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	well	Less common soils occur in avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but are otherwise weakly developed due to recent erosion or deposition.

Glenlily soils were not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Glencairn soil association.

GOLD CREEK Soil Association - GL

Gold Creek soils occur in the Fernie and Flathead basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly fluvioglacial outwash derived from areas of non-calcareous sandstone, siltstone, argillite, shale and coal and deposited as plains, terraces and fans. Slopes generally vary between 5 and 30%, while elevations range between 1800 and 2300 m asl.

Gold Creek soils are well to moderately well drained and rapidly pervious. Textures range from gravelly loam to very gravelly loamy sand with very gravelly sandy loam most common. Coarse fragment contents usually range between 50 and 90% and consist of rounded gravels and cobbles. In a few locations, a thin, coarse-fragment-free, silt loam to fine sandy loam capping may overlie the gravels. A fibrimor forest floor layer up to 10 cm thick usually overlies a <5 cm thick, light gray, very friable, leached horizon (Ae) at the soil surface. These are underlain by a 20 to 30 cm thick solum (Bf, Bm, BC) that is podzolized, yellowish-brown, and extremely to strongly acid. Relatively unweathered acidic parent materials (C) occur below depths of 30 to 50 cm. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GL1	Orthic Humo-Ferric Podzol	well			Consists dominantly of the most common soil as described above.
GL2	Orthic Humo-Ferric Podzol	well	Orthic Dystric Brunisol, Orthic Sombric Brunisol	well	Less common soils are weakly podzolized (Bm) and less deeply leached and weathered, due to development in climatically or edaphically drier locations. Some have a well developed, organic matter enriched (Ah) horizon. The first listed is equivalent to the Galton 1 soil association component.
GL3	Orthic Humo-Ferric Podzol	well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
GL4	Orthic Humo-Ferric Podzol	well	Podzolic Gray Luvisol	well	Less common soil contains a clay accumulation horizon (Bt) due to somewhat finer soil textures.
GL7	Orthic Humo-Ferric Podzol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

GOLD CREEK Soil Association - GL (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GL8	Orthic Humo-Ferric Podzol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur in avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

Gold Creek soils were not described in detail or sampled. A soil with similar morphology that was described, sampled, and analyzed is the Galton soil association.

* GOODUM Soil Association - GD

Goodum soils occur in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in silty sandy fluvial or aeolian veneers that overlie gravelly fluvioglacial terraces and fans derived from areas where limestone, dolomite, sandstone, shale and coal predominate (Plates 3.5, 4.4). The materials are usually dark coloured and alkaline. Slopes generally range between 5 and 30%, while elevations vary from 1350 to 1800 m asl.

Goodum soils are mostly well drained and moderately pervious. Textures range from silt loam to fine sandy loam (most common) in the upper part and between very gravelly loam and very gravelly loamy sand in the fluvioglacial subsoil. Coarse fragment contents in the subsoils range from 50 to 80% and consist of rounded gravels and cobbles. Contents in the upper soil are generally low. A fibrimor forest floor layer up to 6 cm thick is usually present at the soil surface. An intermittent, <5 cm thick, grayish-brown, leached layer (Ae) is sometimes present under the fibrimor layer. It overlies a 25 to 35 cm thick, yellowish-brown, medium acid to neutral solum (Bm, Bmk, BCk). Carbonate enriched, mildly alkaline subsoil layers (IICk, IICca) characterized by white coatings on the undersides of coarse fragments extend from the bottom of the solum to depths that may exceed 1 m. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
GD1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
GD2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol, Orthic Eutric Brunisol; calcareous phase	well	Less common soils occur in climatically or edaphically drier locations dominated by grassy vegetation. Some have a well developed, organic matter enriched surface horizon (Ah), others are mildly alkaline to the surface.
GD3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	well to moderately well	Less common soils occur in climatically or edaphically wetter locations. They have strongly acid, weakly to moderately podzolized solums (Bm, Bf).
GD4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol, Podzolic Gray Luvisol	well to moderately well	Less common soils contain a clay accumulation horizon (Bt) due to somewhat finer textures. In cooler, wetter locations, they may have podzolic upper horizons (Bf).

* GOODUM Soil Association - GD (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GD7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.
GD8	Orthic Eutric Brunisol	well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur in avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analysis, is available in the B.C. Soil Information System.

* GRIZZLY Soil Association - GZ

Grizzly soils occur in the Fernie and Flathead basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in clayey silty fans and veneers overlying gravelly fluvioglacial or fluvial outwash (Figure 3.3). The parent materials, derived from areas of shale, are dark coloured and acidic. Slopes are usually gentle, but may range up to 15%. Elevations vary between 1800 and 2300 m asl.

Grizzly soils are mostly moderately well drained and moderately to slowly pervious. Textures in the upper soil are usually silt loam or silty clay loam (most common) while the fluvioglacial and fluvial subsoils range from gravelly loam to very gravelly loamy sand. Coarse fragment content in the upper soil is generally less than 20% and consists of shaly gravels, while contents in the subsoil vary between 40 and 60%. A fibrimor forest floor layer up to 10 cm thick overlies a <6 cm thick, light brownish gray, friable, leached horizon (Ae1) at the soil surface. These are underlain by a 20 to 60 cm thick horizon (Bf), which is podzolized, brownish-yellow, and extremely to medium acid. It grades (Bm, Ae2) to a clay accumulation zone (Bt), which is 20 to 30 cm thick, silty clay loam, and strong, angular blocky. Parent material (BC,C), somewhat resembling the clay accumulation layer, occurs below depths of about 70 cm and the gravelly subsoil (IIC) begins between 90 and 150 cm. The usual classification is **Luvisolic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
GZ1	Luvisolic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
GZ2	Luvisolic Humo-Ferric Podzol	moderately well	Brunisolic Gray Luvisol	well	Less common soil lacks strongly podzolized upper horizon, and is less deeply leached and weathered, due to development in climatically or edaphically drier locations. It is equivalent to the Frontal 1 soil association component.
GZ3	Luvisolic Humo-Ferric Podzol	moderately well	Luvisolic Ferro-Humic Podzol	moderately well	Less common soil has an organic matter enriched upper solum (Bhf) due to development in climatically or edaphically wetter locations.
GZ4	Luvisolic Humo-Ferric Podzol	moderately well	Orthic Humo-Ferric Podzol	moderately well	Less common soil lacks a well defined clay accumulation horizon due to somewhat coarser textures.
GZ7	Luvisolic Humo-Ferric Podzol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

* GRIZZLY Soil Association - GZ (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GZ8	Luvisolic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur in avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.
GZ9	Luvisolic Humo-Ferric Podzol	moderately well	Orthic Eutric Brunisol	well	Less common soil lacks podzolized and clay accumulation horizons, and has a shallower, more basic solum due to relative youth or the influence of localized, calcareous parent material.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

GRUNDLE Soil Association - GR

Grundle soils occur in the Fernie Basin, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in gravelly, dark colored, acidic, fluvioglacial or fluvial terraces and fans (Figure 3.4), derived from areas of non-calcareous sandstone, siltstone, argillite, shale and coal. Slopes are mostly <5 %, but locally, range up to 30%. Elevations vary between 1050 and 1350 m asl.

Grundle soils are generally well drained and rapidly pervious. Textures range from very gravelly loam to very gravelly loamy sand with very gravelly sandy loam being most common. Coarse fragment contents vary from 60 to 80% and consist mostly of rounded gravels and cobbles. In a few locations, a thin, coarse-fragment-free fluvial or aeolian surface veneer is present. A fibrimor forest floor layer up to 6 cm thick occurs on the soil surface. It overlies a 20 to 30 cm thick, yellowish-brown to strong brown, very strongly to strongly acid solum (Bm, BC) that grades to relatively unweathered, acidic parent material below depths of 30 to 50 cm. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GR1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
GR2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations and has shallower, medium acid solum.
GR3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well to moderately well	Less common soil occurs in climatically or edaphically wetter locations and has podzolized upper horizons (Bf). It is equivalent to the Gold Creek 1 soil association component.
GR4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a clay accumulation horizon (Bt) due to somewhat finer textures.
GR7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

Grundle soils were not described in detail or sampled. A soil with similar morphology that was described, sampled, and analyzed is the Galton soil association.

* GYDOSIC Soil Association - GC

Gydosic soils occur in the Fernie and Flathead basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly, dark colored, alkaline, fluvioglacial outwash plains, terraces and fans derived from areas of limestone, sandstone, shale and coal (Plate 4.10). Slopes usually vary between 5 and 30%, while elevations range between 1800 and 2300 m asl.

Gydosic soils are generally well drained and rapidly pervious. Textures range between very gravelly loam and very gravelly sand, with very gravelly sandy loam being most common. Coarse fragment contents are high, usually between 50 and 80% and consist mostly of rounded gravels and cobbles. In some locations, a thin, coarse-fragment-free, silt loam to fine sandy loam, fluvial or aeolian veneer overlies the gravels. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, light gray, very friable, leached horizon (Ae) which is underlain by a 25 to 35 cm thick, podzolized zone (Bf), which is yellowish-brown and strongly to moderately acid. Mildly alkaline, carbonate enriched horizons (Bmk, BCk) underlie the Bf and at depths below 1 m, grade into relatively unweathered parent material (Ck). The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
GC1	Orthic Humo-Ferric Podzol	well			Consists dominantly of the most common soil as described above.
GC2	Orthic Humo-Ferric Podzol	well	Orthic Eutric Brunisol, Orthic Melanic Brunisol	well	Less common soils lack podzolized horizons, are less deeply weathered and are medium acid to neutral in the solum, due either to development in climatically or edaphically drier locations or to comparative youth.
GC3	Orthic Humo-Ferric Podzol	well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils have organic matter enriched upper horizons, (Bhf, Ah) due to development in climatically or edaphically wetter locations.
GC4	Orthic Humo-Ferric Podzol	well	Podzolic Gray Luvisol	well	Less common soil has a subsurface clay accumulation horizon (Bt) due to a somewhat finer texture.
GC7	Orthic Humo-Ferric Podzol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition and is mildly alkaline to the surface.

* GYDOSIC Soil Association - GC (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
GC8	Orthic Humo-Ferric Podzol	well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur in avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

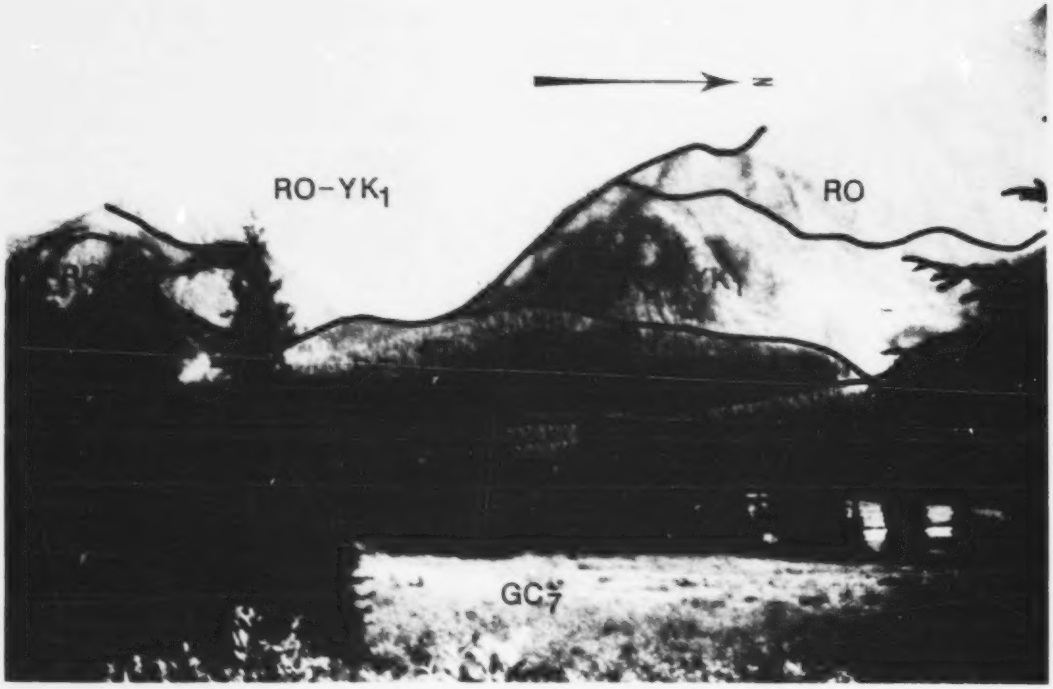

Plate 4.10 Soils in the upper Elk River valley, near Elk Lakes Provincial Park (see text for explanation of symbols).

* HYAK Soil Association - H

Hyak soils occur in the drier portions of the Rocky Mountain Trench, adjacent to the Purcell Mountains. They occupy open grasslands and some cultivated areas in the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty sandy fluvial or aeolian veneers overlying gravelly fluvioglacial outwash plains, terraces and fans derived from areas of non-calcareous bedrocks in the Purcell Mountains (Plate 3.1). Slopes are usually gentle, but locally, range up to 15%; elevations vary from 820 to 1000 m asl.

Hyak soils are well to rapidly drained and are moderately to rapidly pervious. Textures are either silt loam or fine sandy loam (most common) in the upper soil and grade to very gravelly silt loam to very gravelly loamy sand in the subsoil. Coarse fragment contents, consisting of rounded gravels and cobbles, are less than 15% in the surface, but increase to between 50 and 80% in the subsoil. A very dark grayish-brown, organic matter enriched surface horizon (Ah) extends to depths of 10 to 20 cm (sometimes deeper, if cultivated). It is underlain by a 50 to 70 cm thick, dark yellowish brown, medium to slightly acid solum (Bm, BC). Relatively unweathered, gravelly parent materials (IIC) occur below the solum. The usual classification is **Orthic Dark Brown.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
H1	Orthic Dark Brown	well to rapid			Consists dominantly of the most common soil as described above.
H3	Orthic Dark Brown	well to rapid	Orthic Eutric Brunisol, Orthic Melanic Brunisol	well to rapid	Less common soils have thinner, less well developed organic matter enriched surface soil horizons, but otherwise resemble the most common soil.
H7	Orthic Dark Brown	well to rapid	Cumulic Regosol, Orthic Regosol	moderately well to imperfect	Less common soils lack soil development due to occurrence in the active floodplain portions of Hyak map units.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* KASLO Soil Association - KA

Kaslo soils occur in the larger valleys of the Purcell Mountains, within the lodgepole pine-Engelmann spruce - alpine fir subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in gravelly fluvioglacial outwash plains, terraces and fans derived from areas of fine to coarse grained, non-calcareous bedrocks (Figure 3.6). Slopes usually vary between 5 and 30%, while elevations range between 1250 and 1650 m asl.

Kaslo soils are generally well drained and rapidly to moderately pervious. Soil textures range between gravelly loam and very gravelly loamy sand, with gravelly sandy loam being most common. Coarse fragments consisting of rounded gravels and cobbles occupy from 60 to 80% of the subsoil, but are often less in the upper soil. A fibrimor forest floor layer up to 4 cm thick occurs at the soil surface. It is underlain by a <5 cm thick, light gray (dry), leached horizon (Ae) which grades to a yellowish brown, very strongly to strongly acid horizon (Bm) that is usually 15 to 25 cm thick. The Bm grades (BC) to relatively unweathered, acidic, gravelly parent material (C) at about 50 cm depth. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
KA1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
KA2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations and has a light yellowish brown, medium acid, shallower solum (Bm, BC). It is equivalent to the Glencairn 1 soil association component.
KA3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well to moderately well	Less common soil occurs in climatically or edaphically wetter locations and has a podzolized, strongly to extremely acid, upper solum (Bf).
KA4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a subsoil clay accumulation horizon (Bt) due to somewhat finer textures.
KA7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbances or deposition.

KASLO Soil Association - KA (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
KA8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur in avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* KAYOOK Soil Association - KY

Kayook soils occur under open forests on the floor of the Rocky Mountain Trench, within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty, calcareous, aeolian veneers overlying calcareous, gravelly fluvioglacial, and occasionally, morainal (till) deposits. Slopes mostly vary from 2 to 30%, while elevations range between 700 and 1050 m asl.

Kayook soils are mainly well drained and moderately to rapidly pervious. Texture of the upper soil (aeolian veneer) is most commonly silt loam, while the subsoils range from very gravelly loam to very gravelly loamy sand. Coarse fragment content of the subsoils is between 50 and 70% and consists mainly of rounded gravels and cobbles. A raw moder layer up to 5 cm thick consisting of forest litter underlain by a thin, organic matter enriched surface horizon (Ah), is usually present at the soil surface. They overlie a 20 to 30 cm thick, grayish-brown, slightly acid to mildly alkaline solum (Bm, Bmk, BCk). Under this is a carbonate enriched, moderately alkaline layer (Cca, Ck) that extends to depths between 70 and 100 cm. It then changes to relatively unweathered, gravelly, calcareous material (IICk). The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
KY1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
KY2	Orthic Eutric Brunisol	well	Orthic Dark Brown, Calcareous Dark Brown	rapid	Less common soils have well developed organic matter enriched surface horizons and may be mildly alkaline to the soil surface. They occur under dominantly grassy vegetation.
KY4	Orthic Eutric Brunisol	well	Orthic Gray Luvisol, Brunisolic Gray Luvisol	well	Less common soils contain a well developed subsurface clay accumulation horizon (Bt) due to somewhat finer textures.
KY9	Orthic Eutric Brunisol	well	Orthic Eutric Brunisol; calcareous phase		Less common soil is mildly alkaline to the soil surface, but otherwise resembles the most common soil.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* KEENEY Soil Association - KE

Keeney soils occur in the Rocky Mountain Trench and larger valleys in the Rocky and Purcell mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty sandy fluvial or aeolian veneers overlying gravelly fluvioglacial outwash plains, terraces and fans derived from areas of predominantly limestone and dolomite (Plate 4.19). Slopes are usually gentle, but locally, range up to 30%. Elevations vary between 1050 and 1350 m asl.

Keeney soils are well drained and moderately pervious. Textures are silt loam or fine sandy loam (most common) in the upper soil and vary from very gravelly loam to very gravelly loamy sand in the fluvioglacial subsoil. Coarse fragment contents in the subsoil range up to 80% and consist mainly of rounded gravels and cobbles. Contents in the upper soil are low. A fibrimor forest floor layer up to 4 cm thick usually occurs on the soil surface and, in more open areas, overlies a thin organic matter enriched horizon (Ah). These, in turn, overlie a 10 to 30 cm thick, pale brown, slightly acid to mildly alkaline solum (Bm, Bmk, BCk). Carbonate cemented, mildly to moderately alkaline subsoil horizons characterized by white carbonate coatings on the undersides of coarse fragments, extend from the base of the solum to depths that may exceed 1 m (Cca, Ck). The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
KE1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
KE2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol, Orthic Dark Brown	well to rapid	Less common soils have developed under grassy vegetation and have well developed organic matter enriched surface horizons.
KE3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil occurs in climatically or edaphically wetter locations, or on more acidic parent materials. It has a light yellowish brown solum Bm, BC) that is very strongly acid in the upper part.
KE4	Orthic Eutric Brunisol	well	Brunisolic Grey Luvisol	well	Less common soil contains a subsurface clay accumulation horizon (Bt) due to somewhat finer textures.
KE7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or additions. It is alkaline to the surface.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* KINBASKET Soil Association - K

Kinbasket soils occupy limited areas in the Rocky Mountain Trench, within the western larch - ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in gravelly silty morainal (till) materials located on the floor of the Trench (Plate 3.1). The till is generally >1 m deep and derived from calcareous bedrocks. Slopes usually range between 10 and 60 %, while elevations vary between 700 and 1050 m asl.

Kinbasket soils are mostly well drained and moderately to slowly pervious. Texture is usually silt loam, but locally can vary to very gravelly silt loam. Coarse fragment contents range between 20 and 60% and consist of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and overlies a 5 to 25 cm thick, pale brown (dry), medium to slightly acid, leached horizon (Ae). The leached horizon grades to a 15 to 20 cm thick, slightly acid, strong, angular blocky clay accumulation horizon (B) which, in turn, grades (BCk) to mildly to moderately alkaline parent material (Cca, Ck) at about 40 cm depth. The parent material is characterized by white carbonate coatings on the undersides of coarse fragments. The usual classification is **Orthic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
K1	Orthic Gray Luvisol	well			Consists dominantly of the most common soil as described above.
K2	Orthic Gray Luvisol	well	Orthic Eutric Brunisol; Orthic Dark Brown	well to rapid	Less common soils occur in edaphically or climatically drier locations and lack a clay accumulation horizon (Bt). Under grassy vegetation they have a well developed, organic matter enriched surface horizon (Ah). Both are characterized by pale brown to brown, slightly acid brunisolic (Bm) horizons and respectively are equivalent to the Wycliffe 1 and Plumbob 1 soil association components.
K3	Orthic Gray Luvisol	well	Brunisolic Gray Luvisol	well	Less common soil occurs in climatically or edaphically wetter locations and has a light yellowish brown, medium acid brunisolic (Bm) upper horizon. It is equivalent to the Flatbow 1 soil association component.
K5	Orthic Gray Luvisol	well	Orthic Gray Luvisol; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.

* KINBASKET Soil Association - K (Continued)

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
K7	Orthic Gray Luvisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

KINERT Soil Association - KR

Kinert soils occur in the larger valleys of the Purcell Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine - western larch subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in gravelly fluvioglacial outwash plains, terraces and fans derived from areas of relatively coarse grained, non-calcareous bedrocks. Slopes vary from 5 to 30%, while elevations range between 1200 and 1350 m asl.

Kinert soils are well drained and moderately to rapidly pervious. Textures range from gravelly loam to very gravelly sand; the upper horizons are usually gravelly sandy loam. Coarse fragment contents consisting of gravels and cobbles, vary between 60 and 80% in the subsoil, but are usually substantially less in the upper soil. A fibrimor forest floor layer up to 4 cm thick occurs at the soil surface. It is underlain by a light yellowish brown, very strongly to strongly acid solum (Bm, BC) that is 40 to 60 cm thick. It, in turn, is underlain by relatively unweathered, acidic soil parent material (C) at depths below 60 cm. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
KR1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
KR2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations and has a medium acid, shallower solum. It is equivalent to the Glencairn 1 soil association component.
KR3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well to moderately well	Less common soil occurs in climatically or edaphically wetter locations and has a podzolized, yellowish-brown, strongly to extremely acid upper horizon (Bf).
KR4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil has a subsurface clay accumulation horizon (Bt) due to somewhat finer textures.
KR7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

KINERT Soil Association - KR (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
KR8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

Kinert soils were not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Kaslo soil association.

KINGCOME Soil Association - KG

Kingcome soils occur in the Rocky Mountains and parts of the Purcell Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly fluvioglacial outwash plains, terraces and fans derived from areas of predominantly limestone and dolomite (Figure 3.2; Plate 4.8). Slopes vary between 5 and 30% while elevations range from 1800 to 2300 m asl.

Kingcome soils are generally well drained and moderately to rapidly pervious. Textures range between very gravelly loam and very gravelly loamy sand, with very gravelly sandy loam being most common. Coarse fragment contents vary between 50 and 80% and consist of mostly rounded gravels and cobbles. In localized areas, a thin, coarse-fragment-free, silt loam to fine sandy loam veneer may overlie the gravels. A fibrimor forest floor layer up to 12 cm thick and a <5 cm thick, light gray, very friable, leached horizon (Ae) are usually present at the soil surface. These are underlain by 20 to 30 cm of podzolized, yellowish-brown, friable material (Bf, Bm) that is very strongly acid in the upper part. Underlying this are mildly alkaline, carbonate enriched subsoil layers (Bmk, BCk) that grade to unweathered, alkaline parent material (Ck) at about 50 cm depth. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
KG1	Orthic Humo-Ferric Podzol	well			Consists dominantly of the most common soil as described above.
KG2	Orthic Humo-Ferric Podzol	well	Orthic Eutric Brunisol, Orthic Melanic Brunisol	well	Less common soils occur in climatically or edaphically drier locations or may be comparatively younger. They lack podzolized horizons, have relatively shallow, slightly acid to mildly alkaline solums (Bm, Bmk, BCk) and on some dry, southerly exposures, have well developed, organic matter enriched surface horizons (Ah).
KG3	Orthic Humo-Ferric Podzol	well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils occur in climatically or edaphically wetter locations. They have organic matter enriched upper horizons (Bhf, Ah).
KG4	Orthic Humo-Ferric Podzol	well	Podzolic Gray Luvisol	well	Less common soil has a subsurface clay accumulation horizon (Bt) due to somewhat finer textures.

KINGCOME Soil Association - KG (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
KG7	Orthic Humo-Ferric Podzol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition and is alkaline to the surface.
KG8	Orthic Humo-Ferric Podzol	well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but, otherwise are weakly developed due to recent erosion or deposition.

Kingcome soils were not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Gagnebin soil association.

KOKUM Soil Association - KO

Kokum soils occur in the Rocky Mountain Trench under open forests within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in sandy fluvial and fluvioglacial deposits derived from areas of non-calcareous bedrocks in the Purcell Mountains. Slopes are usually <15%, while elevations range between 700 and 910 m asl.

Kokum soils are well drained and rapidly pervious. Textures range from fine sandy loam to sand and may contain up to 20% coarse fragments, composed mainly of rounded gravels. The upper horizons are usually sandy loam. Raw moder up to 4 cm thick consisting of forest litter and a thin, organic matter enriched surface horizon (Ah) are usually present at the soil surface. These overlie a 20 to 30 cm thick, light yellowish brown, medium to slightly acid solum (Bm) which grades to relatively unweathered, medium acid soil parent material (C) below about 50 cm depth. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
KO1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
KO2	Orthic Eutric Brunisol	well	Orthic Dark Brown, Orthic Melanic Brunisol	rapid to well	Less common soils have developed under grassy vegetation and have a well developed, organic matter enriched surface horizon (Ah).
KO3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil occurs in climatically or edaphically wetter locations and has a strongly to very strongly acid solum (Bm, BC).
KO4	Orthic Eutric Brunisol	well	Orthic Gray Luvisol, Brunisolic Gray Luvisol	well	Less common soils contain a subsurface clay accumulation horizon (Bt) due to somewhat finer textures.
KO10	Orthic Eutric Brunisol	well	Gleyed Cumulic Regosol, Cumulic Regosol	imperfect to moderately well	Less common soils lack soil development due to occurrence in active floodplain portions of Kokum map units. They may be weakly gleyed (Cgj) due to flooding or saturation for part of the year.

KOKUM Soil Association - KO (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
KO11	Rego Gleysol	poor to very poor	Orthic Eutric Brunisol	well	Most common soil occurs on lowest lying, floodplain portions of Kokum map units and is strongly gleyed (Cg) due to flooding or saturation for most of the year. The less common soil is as described for Kokum soils.

Kokum soils were not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Lakit soil association.

* LAKIT Soil Association - L

Lakit soils occur in the Rocky Mountain Trench, under open forests within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in shallow, silty sandy aeolian or fluvial veneers that overlie gravelly fluvial terraces derived from areas of non-calcareous bedrocks in the Purcell Mountains (Plate 3.1). Slopes are usually <15% and elevations range from 700 to 910 m asl.

Lakit soils are mostly well drained and moderately pervious. Textures in the upper soil range from silt loam to sand, but fine sandy loam is most common. Subsoil textures range from gravelly loam to very gravelly loamy sand. Coarse fragment contents in the subsoil vary from 40 to 70% and consist mostly of rounded gravels and cobbles; contents in the upper soil are usually low. Raw moder up to 4 cm thick consisting of forest floor litter and a thin, organic matter enriched surface horizon (Ah) are usually present at the soil surface. These are underlain by 20 to 30 cm thick solum (Bm, BC), which is light yellowish brown and medium to strongly acid. Gravel content increases with depth within the solum. Under this is relatively unweathered, medium acid soil parent material (IIC). The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
L1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
L2	Orthic Eutric Brunsiol	well	Orthic Dark Brown, Orthic Melanic Brunisol	rapid to well	Less common soils have developed under grassy vegetation and have a well developed, organic matter enriched surface horizon (Ah).
L3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil occurs in climatically or edaphically wetter locations. It has a very strongly to strongly acid solum (Bm, BC) and is equivalent to the Glenlily 1 soil association component.
L10	Orthic Eutric Brunisol	well	Gleyed Cumulic Regosol, Cumulic Regosol	imperfect to moderately well	Less common soils lack soil development due to occurrence in active floodplain portions of Lakit map units. They may be weakly gleyed (Cgj) due to flooding or saturation for part of the year.

* LAKIT Soil Association - L (Continued)

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
L11	Rego Gleysol	poor to very poor	Orthic Eutric Brunisol	well	Most common soil occurs on the lowest lying floodplain portions of Lakit map units and is strongly gleyed (Cg) due to flooding or saturation for most of the year. The less common soil is as described for Lakit soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* LANCASTER Soil Association - LN

Lancaster soils occupy limited areas in a few of the larger valleys in the Rocky Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpin fir Forest Zone. They have developed on silty glaciolacustrine terraces or plains that are usually deep, but locally, may be shallow over till (Plate 3.5). Slopes mostly range between 5 and 30%, but are much steeper in gullies and on escarpments. Elevations vary between 1350 and 1800 m asl.

Lancaster soils are generally moderately well drained and slowly pervious. Texture is mostly silt loam, but may range to silty clay loam. Coarse fragments are not usually present. A fibrimor forest floor layer up to 8 cm thick usually occurs at the soil surface and overlies a <5 cm thick, light gray (dry), leached horizon (Ae1). It, is turn, overlies a 15 to 25 cm thick, light yellowish brown, very strongly acid horizon (Bm). This grades through another leached layer (Ae2) to a 10 to 20 cm thick, strong, angular blocky clay accumulation horizon (Bt). It, in turn, is underlain by neutral to mildly alkaline subsoil horizons (Btk, BCk) which are underlain by alkaline, unweathered parent material (Ck) at about 60 cm depth. The usual classification is **Brunisolic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
LN1	Brunisolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
LN2	Brunisolic Gray Luvisol	moderately well	Orthic Gray Luvisol	well to moderately well	Less common soil occurs in climatically or edaphically drier locations. It lacks a light yellowish-brown upper horizon (Bm) and is equivalent to the Abruzzi 1 soil association component.
LN3	Brunisolic Gray Luvisol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil occurs in climatically or edaphically wetter locations. It has a yellowish-brown, podzolized upper horizon (Bf).
LN4	Brunisolic Gray Luvisol	moderately well	Orthic Eutric Brunisol	well to moderately well	Less common soil lacks a clay accumulation horizon (Bt) due to somewhat coarser textures.
LN7	Brunisolic Gray Luvisol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

* LANCASTER Soil Association - LN (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
LN8	Brunisolic Gray Luvisol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* LAWLEY Soil Association - LY

Lawley soils occupy limited areas in a few larger valleys of the Purcell Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine - western larch subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed on silty glaciolacustrine terraces and plains that are usually deep, but locally, may be shallow over till. Slopes usually range between 5 and 30%, but in gullies and on escarpments may be much steeper. Elevations vary between 1200 and 1350 m asl.

Lawley soils are generally moderately well drained and slowly pervious. Textures range from silty clay loam to silt loam (most common). Coarse fragments are not usually present. A fibrimor forest floor layer up to 8 cm thick usually occurs at the soil surface. It overlies a 10 to 20 cm thick, light yellowish brown, strongly acid horizon (Bm) which grades to a 25 to 35 cm thick, strong angular blocky clay accumulation horizon (Bt). The clay accumulation horizon is underlain by neutral to mildly alkaline subsoil horizons (BCk, Ck) at about 60 cm depth. The usual classification is **Brunisolic Gray Luvisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
LY1	Brunisolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
LY2	Brunisolic Gray Luvisol	moderately well	Orthic Gray Luvisol	well to moderately well	Less common soil occurs in climatically or edaphically drier locations and lacks a light yellowish brown upper horizon (Bm).
LY3	Brunisolic Gray Luvisol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil occurs in climatically or edaphically wetter locations and has a yellowish-brown, podzolized upper horizon (Bf).
LY4	Brunisolic Gray Luvisol	moderately well	Orthic Dystric Brunisol	well to moderately well	Less common soil has very strongly to strongly acid upper horizons but lacks a clay accumulation horizon (Bt), due to somewhat coarser textures.
LY7	Brunisolic Gray Luvisol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

* LAWLEY Soil Association - LY (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
LY8	Brunisolic Gray Luvisol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

LINTEN Soil Association - LL

Linten soils occupy limited areas in a few larger valleys of the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in silty glaciolacustrine terraces and plains that are usually deep, but locally, may be shallow over till (Figure 3.2; Plate 4.8). Slopes are mostly between 5 and 30%, but are much steeper in gullies and on escarpments. Elevations range between 1800 and 2300 m asl.

Linten soils are generally moderately well drained and slowly pervious. Texture is most commonly silt loam but may range to silty clay loam. Coarse fragments are not usually present. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a thin, discontinuous, light grey, leached horizon (Ae). It, in turn, overlies a 10 to 20 cm thick, yellowish-brown, very strongly acid, podzolized horizon (Bf) underlain by a strongly acid Bm horizon about 10 cm thick. Under this are mildly alkaline, subsoil horizons (Bmk, BCk), which grade to alkaline parent material (Ck) at about 50 cm depth. In some locations, a weakly developed clay accumulation horizon (Btj) may underlie the brunisolic (Bm) horizon. Linten soils are transitional in development between luvisolic and podzolic soils but, because well developed Bt horizons are not consistently present, have been classified as **Orthic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
LL1	Orthic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
LL2	Orthic Humo-Ferric Podzol	moderately well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations or is comparatively younger. It has thin, light yellowish brown, slightly acid upper horizons (Bm).
LL3	Orthic Humo-Ferric Podzol	moderately well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils occur in climatically or edaphically wetter locations. They have organic matter enriched upper horizons (Bhf, Ah).
LL4	Orthic Humo-Ferric Podzol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil has a well developed clay accumulation horizon (Bt) due to slightly finer textures.
LL7	Orthic Humo-Ferric Podzol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

LINTEN Soil Association - LL (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
LL8	Orthic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Linten soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Lancaster soil association.

* MADIAS Soil Association - MA

Madias soils occur in the Kootenay and White river drainages of the Rocky Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty sandy fans or veneers which overlie gravelly fluvioglacial and fluvial terraces derived from areas of phyllite, limestone and dolomite (Plates 4.6, 4.11). Slopes are usually gentle but locally, may range up to 15%. Elevations vary between 1050 and 1350 m asl.

Madias soils are mostly moderately well drained and moderately to slowly pervious. Texture of the surface horizons is usually silt loam, but may also be fine sandy loam. The subsurface clay accumulation horizon is usually silty clay loam. The subsoils vary from very gravelly loam to very gravelly loamy sand. Coarse fragment content in the upper soil is usually less than 20% and consists of slaty gravels. The contents in the subsoils are between 60 and 90%, composed mainly of rounded and slaty gravels and some cobbles. A fibrimor forest floor layer up to 6 cm thick is usually present at the soil surface and overlies a 15 to 25 cm thick horizon (Ae) that is light gray, medium acid, friable and leached. This, in turn, is underlain by a 10 to 15 cm thick, light gray, slightly acid, strong subangular blocky clay accumulation zone (Bt), which grades to mildly alkaline parent material (Ck) below approximately 40 cm depth. The underlying gravelly materials (IICk) begin at about 1 m. The usual classification is **Orthic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MA1	Orthic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
MA2	Orthic Gray Luvisol	moderately well	Orthic Eutric Brunisol, Orthic Eutric Brunisol; calcareous phase	well	Less common soils lack a clay accumulation horizon and have a very pale brown, medium acid to mildly alkaline surface horizon (Bm, Bmk) indicating less intensive weathering and leaching due to climatically or edaphically drier conditions.
MA3	Orthic Gray Luvisol	moderately well	Brunisolic Gray Luvisol	moderately well	Less common soil has a pale brown, weakly podzolized surface horizon (Bm) indicating more intense weathering due to climatically or edaphically wetter conditions.
MA7	Orthic Gray Luvisol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition and is alkaline to the surface.

* MADIAS Soil Association - MA (Continued)

Soil Assoc. Component	Most Common Soil Classification	 Drainage	Less Common Soil Classification	 Drainage	Comments
MA10	Orthic Gray Luvisol	moderately well	Rego Gleysol; calcareous phase	poor to very poor	Less common soil is strongly gleyed due to submergence or saturation for most of the year. It is mildly alkaline to the soil surface (Cgk).

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

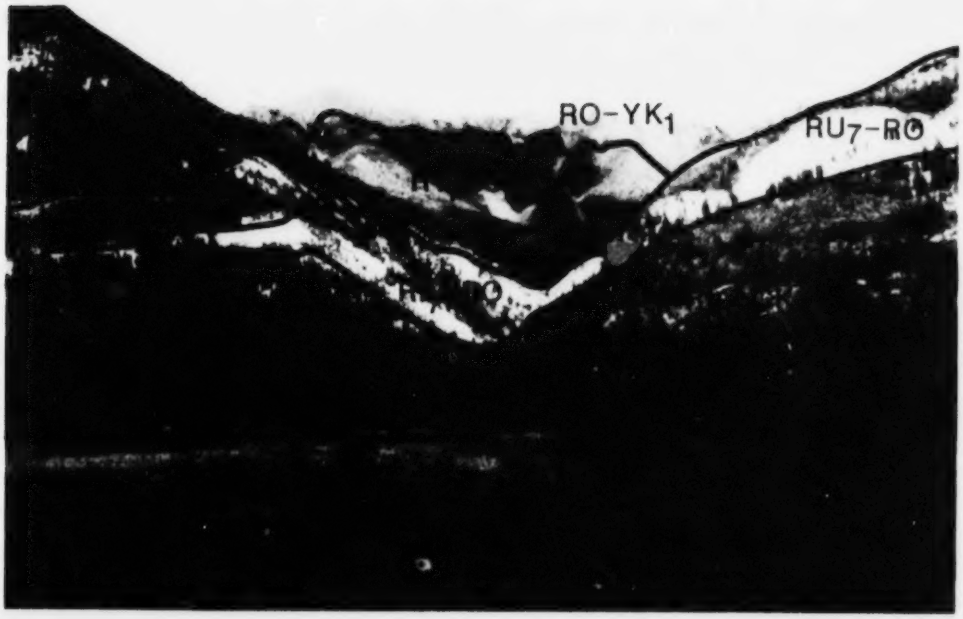

Plate 4.11 Soils in the Yearling Creek area, Kootenay National Park (see text for explanation of symbols).

* MAGUIRE Soil Association - MR

Maguire soils occupy limited areas in the Fernie and Flathead basins of the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in fine to rubbly fine morainal (till) deposits that occupy valley floor, lower valley side, and to a lesser extent, mountain summit locations (Plate 4.12). The till deposits are usually >1 m thick and are derived from fine to medium grained, non-calcareous bedrocks. Slopes mostly range between 10 and 60%, while elevations vary between 1800 and 2300 m asl.

Maguire soils are generally moderately well drained and moderately to slowly pervious. Textures are usually silty clay loam (most common) or silt loam, but locally, may be gravelly with up to 50% coarse fragment content composed mostly of slaty gravels, with lesser cobbles and stones. A fibrimor forest floor layer up to 12 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, leached horizon (Ae1), which, in turn, overlies a 15 to 35 cm thick, yellowish-brown (dry), extremely to strongly acid podzolized horizon (Bf). This grades (Bm, Ae2) to a 30 to 50 cm thick, strong, angular blocky clay accumulation horizon (Bt) that begins at depths between 50 and 60 cm. Very stronglv to slightly acid subsoils (BC, C), resembling the Bt, begin at about 90 cm depth. The usual classification is **Luvisolic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
MR1	Luvisolic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
MR2	Luvisolic Humo-Ferric Podzol	moderately well	Podzolic Gray Luvisol, Brunisolic Gray Luvisol	moderately well	Less common soils occur in climatically or edaphically drier locations. The clay accumulation horizon occurs within 50 cm of the surface. Where the upper horizon is brunisolic (Bm), the soil is equivalent to the Matkin 1 soil association component.
MR3	Luvisolic Humo-Ferric Podzol	moderately well	Luvisolic Ferro-Humic Podzol	moderately well	Less common soil has an organic matter enriched upper horizon (Bhf) due to development in climatically or edaphically wetter locations.
MR4	Luvisolic Humo-Ferric Podzol	moderately well	Orthic Humo-Ferric Podzol	moderately well	Less common soil lacks a clay accumulation horizon due to slightly coarser textures.
MR5	Luvisolic Humo-Ferric Podzol	moderately well	Luvisolic Humo-Ferric Podzol; shallow lithic phase	moderately well to well	Less common soil is 50 to 100 cm thick over bedrock.

* MAGUIRE Soil Association - MR (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MR7	Luvisolic Humo-Ferric Podzol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
MR8	Luvisolic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface or subsurface horizons but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

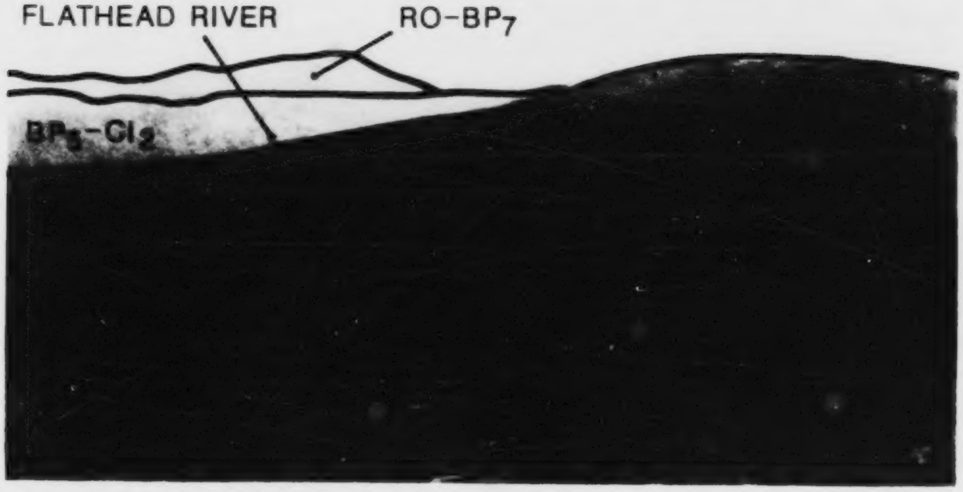

Plate 4.12 Soils in the McEvoy Creek area, Flathead Basin (see text for explanation of symbols).

MAIYUK Soil Association - MU

Maiyuk soils occur in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly sandy morainal (till) deposits on valley floors and lower valley sides (Plate 4.3). The till is generally >1 m thick and derived from non-calcareous, sandstone, quartzite and conglomerate. Slopes vary between 10 and 60%, while elevations range between 1350 and 1800 m asl.

Maiyuk soils are generally well drained and moderately pervious. Textures range from gravelly loam to very gravelly loamy sand, with gravelly sandy loam being most common. Coarse fragment contents vary between 20 and 60%, and consist mainly of subangular and subrounded gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a <5 cm thick, light brownish gray (dry), leached horizon (Ae). Under this is a 25 to 40 cm thick, yellowish-brown, extremely to strongly acid solum (Bm, BC) which grades to relatively unweathered, strongly to slightly acid parent material (C) at depths between 40 and 60 cm. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
MU1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
MU2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations and has a shallower, light yellowish brown, medium to slightly acid solum (Bm, BC).
MU3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	moderately well	Less common soil occurs in climatically or edaphically wetter locations and has a podzolized, upper horizon (Bf). It is equivalent to Minitown 1 soil association component.
MU4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol, Podzolic Gray Luvisol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. Under wetter, cooler conditions, they may have podzolic upper horizons (Bf).
MU5	Orthic Dystric Brunisol	well	Orthic Dystric Brunisol; shallow lithic phase	well	Less common soil is 50 to 100 cm thick over bedrock.

MAIYUK Soil Association - MU (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MU7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.
MU8	Orthic Dystric Brunsiol	well	Cumulic Humic Regosol; Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

The Maiyuk soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Minitown soil association.

* MALPASS Soil Association - MS

Malpass soils occur in the drier portions of the Purcell Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in gravelly silty morainal (till) deposits derived from fine to medium grained, non-calcareous bedrock (Plate 3.7). The materials are usually >1 m deep and occur on valley floors and lower valley walls. Slopes range between 10 and 60%, while elevations vary from 1050 to 1350 m asl.

Malpass soils are dominantly well drained and moderately to slowly pervious. Texture is usually silt loam with variation to very gravelly silt loam in some areas. Coarse fragment contents range between 20 and 60% and consist mainly of subangular and subrounded gravels with some cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and overlies a 20 to 30 cm thick, pale brown (dry) horizon (Bm) that is medium to slightly acid. Under this is usually a 20 to 30 cm thick, weakly developed clay accumulation horizon (Btj) that grades (BC) to similar appearing, medium acid parent material (C) at about 60 cm depth. Malpass soils are transitional to Brunisolic Gray Luvisols, but lacking well developed clay accumulation horizons (Bt), are classified as **Orthic Eutric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
MS1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
MS2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol	well	Less common soil has developed under grassy vegetation in climatically or edaphically drier locations. It is characterized by a well developed, dark coloured, organic matter enriched surface horizon (Ah).
MS3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	well	Less common soils occur in climatically or edaphically wetter locations, or on more acidic parent materials. They have deeper, yellowish-brown (dry), extremely to strongly acid upper horizons (Bm, Bf).
MS4	Orthic Eutric Brunisol	well	Brunisol Gray Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt).
MS5	Orthic Eutric Brunisol	well	Orthic Eutric Brunisol; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.

* MALPASS Soil Association - MS (Continued)

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
MS7	Orthic Eutric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

MANSFIELD Soil Association - MF

Mansfield soils occupy limited areas at lower elevations in the Fernie Basin within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone (Figure 3.4). They have developed in gravelly sandy morainal (till) deposits on valley floors and on lower valley sides. The till is generally >1 m thick and derived from non-calcareous sandstone, quartzite and conglomerate. Slopes vary from 10 to 60%, while elevations range between 1050 and 1350 m asl.

Mansfield soils are well drained and moderately to rapidly pervious. Textures vary between gravelly loam and very gravelly loamy sand, with gravelly sandy loam being most common. Coarse fragment contents range from 20 to 60% and consist of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a 20 to 40 cm thick, brownish-yellow (dry) horizon (Bm) that is extremely to strongly acid. This horizon grades (BC) to strongly to slightly acid, relatively unweathered parent material (C) below about 50 cm. The usual classification is **Orthic Dystric Brunisol.**

Soil	Most Common Soil		Less Common Soil		
Assoc. Component	Classification	Drainage	Classification	Drainage	Comments
MF1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
MF2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well	Less common soil occurs in climatically or edaphically drier locations, or on less acidic parent materials. It has a thinner, light yellowish brown, medium acid to neutral solum (Bm, BC).
MF3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well	Less common soil occurs in climatically or edaphically wetter locations. It has a yellowish-brown, more deeply weathered, podzolized upper horizon (Bf) and is equivalent to the Minitown 1 soil association component.
MF5	Orthic Dystric Brunisol	well	Orthic Dystric Brunisol; shallow lithic phase	well to rapid	Less common soil is dominantly 50 to 100 cm thick over bedrock.
MF7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.

The Mansfield soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Minitown soil association.

* MARCONI Soil Association - MC

Marconi soils occur at the upper elevations of the Rocky Mountains and portions of the Purcell Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly silty morainal (till) deposits usually >1 m deep derived from calcareous bedrocks (Plates 4.8, 4.13). They occupy valley floors and sides and, in the mountain summit topography, have slopes between 10 and 60%. Elevations range between 1800 and 2300 m asl.

Marconi soils are generally moderately well drained and moderately pervious. Textures are variable and range from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment contents range between 30 and 60% and consist of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick normally occurs at the soil surface and overlies a light gray (dry), leached horizon (Ae), usually <5 cm thick. It, in turn, is underlain by a 10 to 20 cm thick yellowish-brown (dry), very strongly acid, podzolic horizon (Bf), which grades (Bm, BCk) to neutral or mildly alkaline, carbonate enriched subsoils (Cca, Ck) at depths below 30 to 40 cm. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MC1	Orthic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
MC2	Orthic Humo-Ferric Podzol	moderately well	Orthic Eutric Brunisol	moderately well to well	Less common soil occurs in climatically or edaphcally drier locations. It has a thin, light yellowish brown, medium acid to neutral upper hoirzon (Bm) and is equivalent to the Spillimacheen 1 soil association component.
MC3	Orthic Humo-Ferric Podzol	moderately well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils occur in climatically or edaphically wetter locations. They have organic matter enriched upper horizons (Bhf, Ah).
MC4	Orthic Humo-Ferric Podzol	moderately well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	moderately well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. The first listed is equivalent to the McKay Mountain 1 soil association component.
MC5	Orthic Humo-Ferric Podzol	moderately well	Orthic Humo-Ferric Podzol; shallow lithic phase	moderately well to well	Less common soil is 50 to 100 cm thick over bedrock.

*** MARCONI Soil Association - MC (Continued)**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MC7	Orthic Humo-Ferric Podzol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent erosion or deposition.
MC8	Orthic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur in avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

Plate 4.13 Soils in the Quarrie Creek-Forsyth Creek area, Rocky Mountains (see text for explanation of symbols).

* MARMALADE Soil Association - MD

Marmalade soils occur in both the Rocky and Purcell mountains, and in the Rocky Mountain Trench, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in gravelly silty morainal (till) deposits derived from calcareous bedrocks. The till is usually >1 m deep and occurs on valley floors and on lower valley sides. Slopes are usually 10 to 60%, while elevations range between 1050 and 1350 m asl.

Marmalade soils are generally well drained and moderately pervious. Textures range between gravelly silt loam (most common) and very gravelly sandy loam. Coarse fragment contents vary between 20 and 60% and consist of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface. It overlies a 5 to 10 cm thick, yellowish-brown, medium acid to neutral horizon (Bm) which grades (Bmk, BCk) to moderately alkaline, carbonate enriched and cemented subsurface horizons (Cca, Ck) at about 25 cm. The carbonates are present as white accumulations on the undersides of coarse fragments. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MD1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
MD2	Orthic Eutric Brunisol	well	Orthic Dark Brown, Orthic Melanic Brunisol	well to rapid	Less common soils have well developed, organic matter enriched horizons (Ah) due to occurrence in climatically or edaphically drier locations dominated by grassy vegetation. The first is equivalent to the Plumbob 1 soil association component.
MD3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil has a deeper, dark yellowish brown, extremely to strongly acid upper horizon (Bm) due to development in climatically or edaphically moister locations, or on somewhat more acidic parent materials.
MD4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol, Orthic Gray Luvisol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. On drier sites they may lack a Bm horizon. They are respectively equivalent to the Flatbow 1 and Kinbasket 1 soil association components.

* MARMALADE Soil Association - MD (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MD5	Orthic Eutric Brunisol	well	Orthic Eutric Brunisol; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.
MD7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

MATKIN Soil Association - MK

Matkin soils occur in the Fernie and Flathead basins, within the Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Figure 3.8). They have developed in fine to rubbly fine morainal (till) deposits on valley floors and lower valley sides (Plate 3.5). The till is generally >1 m thick and derived from non-calcareous, medium to fine grained bedrocks. Slopes range between 10 and 60%, while elevations vary from 1350 to 1800 m asl.

Matkin soils are mostly moderately well drained and moderately to slowly pervious. Textures vary from silty clay loam (most common) to gravelly silt loam. Coarse fragment content is usually substantially less than 50% and consists of slaty gravels, with lesser cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a <5 cm thick, discontinuous, brown (moist), leached horizon (Ae1). Under this is a 10 to 20 cm thick, brownish-yellow, extremely to strongly acid horizon (Bm), which grades (Ae2) to a 10 to 40 cm thick, strong, angular blocky, clay accumulation horizon (Bt). It, in turn, grades (BC) to relatively unweathered, strongly acid to neutral parent material (C) at about 75 cm depth. The usual classification is **Brunisolic Gray Luvisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
MK1	Brunisolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
MK2	Brunisolic Gray Luvisol	moderately well	Orthic Gray Luvisol	well	Less common soil occurs in climatically or edaphically drier locations. It is characterized by a pale brown (dry), leached, surface horizon (Ae) that grades to a clay accumulation horizon.
MK3	Brunisolic Gray Luvisol	moderately well	Luvisolic Humo-Ferric Podzol, Podzolic Gray Luvisol	moderately well	Less common soils occur in climatically or edaphically wetter locations, and have a dark yellowish-brown (dry), podzolized, upper horizon (Bf). The first is equivalent to the Maguire 1 soil association component.
MK4	Brunisolic Gray Luvisol	moderately well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	moderately well	Less common soils lack a clay accumulation horizon (Bt) due to slightly coarser textures. On wetter, cooler sites they may have a podzolic upper horizon (Bf).
MK5	Brunisolic Gray Luvisol	moderately well	Brunisolic Gray Luvisol; shallow lithic phase	moderately well to	Less common soil is 50 to 100 cm thick over bedrock.

MATKIN Soil Association - MK (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MK7	Brunisolic Gray Luvisol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
MK8	Brunisolic Gray Luvisol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur in avalanche tracks and run-out zones. They may contain organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

The Matkin soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Maguire soil association.

* MAYOOK Soil Association - M

Mayook soils occur in the Rocky Mountain Trench and on the floors of adjacent larger valleys in the Rocky and Purcell mountains. They occur under mixed open forest and grassland within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed on silty glaciolacustrine terraces and plains (Figure 3.1; Plate 3.1) in which the glaciolacustrine materials are usually deep, but, in places, may be as shallow as 1 m over till. Slopes are usually between 2 and 30%, except on escarpments and in gullies where they are much steeper. Elevations range between 700 and 900 m asl.

Mayook soils are well drained and moderately pervious. Texture is usually silt loam, but may range to silty clay loam. Coarse fragments are not present. A rhizomull forest floor layer up to 6 cm thick consisting of plant litter overlying a thin organic matter enriched surface horizon (Ah) occurs at the soil surface. These are underlain by a 5 to 20 cm thick, light yellowish brown to pale brown (dry), slightly acid horizon (Bm). At 10 to 20 cm depth, the Bm grades to neutral to moderately alkaline horizons (Bmk, BCk). Unweathered parent material (Ck) is encountered at depths between 30 and 40 cm. At some locations, a weakly developed clay accumulation horizon (Btj) may occur beneath the Bm. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
M1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
M2	Orthic Eutric Brunisol	well	Orthic Dark Brown, Calcareous Dark Brown	well	Less common soils have well developed organic matter enrich-surface horizons (Ah, Ahk) due to development under grassy vegetation.
M4	Orthic Eutric Brunisol	well	Orthic Gray Luvisol, Brunisolic Gray Luvisol	well	Less common soils have a well developed subsurface clay accumulation horizon (Bt). They are respectively equivalent to the Abruzzi 1 and Lancaster 1 soil association components.
M7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance and/or deposition.

* MAYOOK Soil Association - M (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
M10	Orthic Eutric Brunisol	well	Calcareous Dark Brown; saline phase	moderately well	Less common soil occurs on seepage receiving, lower slopes and in depressions, under grassy vegetation. It is saline and calcareous to the surface and has a well developed organic matter enriched surface horizon (Ahks).

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* McCORN Soil Association - ML

McCorn soils occupy limited areas at higher elevations in the Fernie and Flathead basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Figure 3.3). They have developed in fine to rubbly fine morainal (till) materials derived from friable, usually non-calcareous shale. The till deposits are usually >1 m thick and occur on valley floors, valley walls and, to a lesser extent, in mountain summit topography. Slopes vary between 10 and 60%, while elevations range between 1800 and 2300 m asl.

McCorn soils are generally moderately well drained and slowly pervious. Textures vary from silty clay loam (most common) to silt loam and locally, are sometimes gravelly. Coarse fragment contents are usually less than 20% but locally can range to 50% and consist of mostly gravel sized, shaly fragments. A fibrimor forest floor layer up to 10 cm thick occurs at the soil surface and overlies a <5 cm thick, light brownish gray (dry), leached horizon (Ae1). Under this is a 20 to 25 cm thick, yellowish-brown (dry), extremely to strongly acid, podzolized horizon (Bf). This grades (Bm, Ae2) to a 20 to 40 cm thick, strong, angular blocky, clay accumulation horizon (Bt) that begins at depths between 50 and 80 cm. Under this are dark brown (moist), extremely to strongly acid subsoil horizons (BC, C) that resemble the clay accumulation horizon. The usual classification is **Luvisolic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
ML1	Luvisolic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
ML2	Luvisolic Humo-Ferric Podzol	moderately well	Podzolic Gray Luvisol, Brunisolic Gray Luvisol	moderately well	Less common soils occur in climatically or edaphically drier locations. The clay accumulation horizon begins within 50 cm from the soil surface and, on drier sites, the upper horizon may be brunisolic (Bm). The second listed soil is equivalent to the Morrissette 1 soil association component.
ML3	Luvisolic Humo-Ferric Podzol	moderately well	Luvisolic Ferro-Humic Podzol	moderately well	Less common soil has an organic matter enriched upper horizon (Bhf) due to development in climatically or edaphically wetter locations.
ML4	Luvisolic Humo-Ferric Podzol	moderately well	Orthic Humo-Ferric Podzol	moderately well	Less common soil lacks a clay accumulation horizon due to slightly coarser textures.
ML5	Luvisolic Humo-Ferric Podzol	moderately well	Luviolic Humo-Ferric Podzol; shallow lithic phase	moderately well to well	Less common soil is 50 to 100 cm thick over bedrock.

* McCORN Soil Association - ML (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
ML7	Luvisolic Humo-Ferric Podzol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
ML8	Luvisolic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

McKAY MOUNTAIN Soil Association - MX

McKay Mountain soils occur in the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Figure 3.2). They have developed in gravelly silty morainal (till) materials derived from calcareous bedrocks. The till is usually >1 m thick and occurs on valley floors and walls, and in mountain summit topography. Slopes vary between 10 to 60%, while elevations range between 1800 and 2300 m asl.

McKay Mountain soils are mostly moderately well drained and moderately to slowly pervious. Texture is most commonly gravelly silt loam, but in many locations may be either silt loam or very gravelly silt loam. Coarse fragment contents usually range between 20 and 60% and are composed of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface and is underlain by a <5 cm thick, discontinuous, pale brown (dry), leached horizon (Ae1). This is underlain by a 10 to 30 cm thick, yellowish-brown, medium to strongly acid, podzolized horizon (Bf), which grades (Bm, Ae2) to a 10 to 20 cm thick strong, angular blocky, clay accumulation horizon (Bt) beginning at about 30 cm depth. The clay accumulation horizon grades to mildly or moderately alkaline parent material (BCk, Ck) at depths near 50 cm. The usual classification is **Podzolic Gray Luvisol**.

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
MX1	Podzolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
MX2	Podzolic Gray Luvisol	moderately well	Brunisolic Gray Luvisol	moderately well to well	Less common soil occurs in climatically or edaphically drier locations and has a light yellowish brown, brunisolic surface horizon (Bm). It is equivalent to the Mount Mike 1 soil association component.
MX3	Podzolic Gray Luvisol	moderately well	Podzolic Gray Luvisol; ferro-humic phase	moderately well	Less common soil occurs in climatically or edaphically wetter locations and has an organic matter enriched, upper horizon (Bhf).
MX4	Podzolic Gray Luvisol	moderately well	Orthic Humo-Ferric Podzol; Orthic Eutric Brunisol	moderately well to well	Less common soils lack subsurface clay accumulation horizons due to slightly coarser textures. On drier, warmer sites they have light yellowish brown, medium acid to neutral surface horizons (Bm). They are respectively equivalent to the Marconi 1 and Spillimacheen 1 soil association components.

McKAY MOUNTAIN Soil Association - MX (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
MX5	Podzolic Gray Luvisol	moderately well	Podzolic Gray Luvisol; shallow lithic phase	well	Less common soil is 50 to 100 cm thick over bedrock.
MX7	Podzolic Gray Luvisol	moderately well	Orthic Regosol; calcarous phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
MX8	Podzolic Gray Luvisol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The McKay Mountain soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Mount Mike soil association.

* McLATCHIE Soil Association - MT

McLatchie soils occupy limited areas in the Elk and Flathead river drainages of the Rocky Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in silty to gravelly silty morainal (till) materials derived from calcareous sandstone or mixed sandstone and limestone . The till is usually >1 m thick and occurs on valley floors and lower valley sides. Slopes usually vary between 10 and 60%, while elevations range between 1350 and 1800 m asl.

McLatchie soils are dominantly moderately well drained and moderately to slowly pervious. Texture is usually silt loam, although gravelly or very gravelly silt loam is also common. Coarse fragment contents range from 20 to 60% and consist of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and is underlain by a <5 cm thick, discontinuous, grayish, leached horizon (Ae1). Under this is a 20 to 40 cm thick, light yellowish brown to yellowish-brown (dry), medium to slightly acid horizon (Bm), that grades (Ae2) to a 15 to 25 cm thick, strong, angular blocky, clay accumulation horizon (Bt). This, in turn, is underlain by moderately alkaline parent materials (Cca, Ck) at about 70 cm depth. The parent material is characterized by white carbonate accumulations on the undersides of coarse fragments. The usual classification is **Brunisolic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
MT1	Brunisolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
MT2	Brunisolic Gray Luvisol	moderately well	Orthic Gray Luvisol	moderately well to well	Less common soil occurs in climatically or edaphically drier locations and is characterized by a thick, grayish, leached surface horizon (Ae) that overlies the clay accumulation horizon (Bt). It is equivalent to the Murdock 1 soil association component.
MT3	Brunisolic Gray Luvisol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil has a yellowish-brown (dry), strongly acid, podzolized, upper horizon (Bf) and occurs in climatically or edaphically wetter locations. It is equivalent to the McQuaigly 1 soil association component.
MT4	Brunisolic Gray Luvisol	moderately well	Orthic Eutric Brunisol, Orthic Humo-Ferric Podzol	moderately well	Less common soils lack clay accumulation horizons due to slightly coarser textures. On wetter, cooler sites they may have podzolic surface horizons (Bf).

* McLATCHIE Soil Association - MT (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MT5	Brunisolic Gray Luvisol	moderately well	Brunisolic Gray Luvisol; shallow lithic phase	moderately well to well	Less common soils are 50 to 100 cm thick over bedrock.
MT7	Brunisolic Gray Luvisol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
MT8	Brunisolic Gray Luvisol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise lack soil development due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* McQUAIGLY Soil Association - MG

McQuaigly soils occupy limited areas at the higher elevations in the Elk and Flathead river drainages, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly silty morainal deposits on valley floors, valley sides and, to a lesser extent, in mountain summit topography (Plates 4.10, 4.14). The till is usually >1 m deep and derived from calcareous sandstone, or mixed sandstone and limestone bedrocks. Slopes vary from 10 to 60%, while elevations range between 1800 and 2300 m asl.

McQuaigly soils are generally moderately well drained and moderately to slowly pervious. The texture is usually silt loam, but locally can vary to gravelly silt loam or very gravelly silt loam. Coarse fragment contents lie between 20 and 60% and consist of subangular and subrounded gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 8 cm thick usually occurs at the soil surface and overlies a <5 cm thick, pale brown, leached (Ae1) horizon. This is underlain by a 15 to 20 cm thick, yellowish-brown (dry), strongly acid, podzolized horizon (Bf), that grades (Bm, Ae2) to a 10 to 20 cm thick, strong angular blocky clay accumulation horizon (Bt) that begins at about 40 cm depth. It grades (Btk, BCk) to carbonate enriched, neutral to moderately alkaline parent material (Cca, Ck) at depths near 60 cm. White carbonate coatings on the undersides of coarse fragments characterize the parent material. The usual classification is **Podzolic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MG1	Podzolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
MG2	Podzolic Gray Luvisol	moderately well	Brunisolic Gray Luvisol	moderately well to well	Less common soil has a shallower, light yellowish brown (dry), medium to slightly acid upper horizon (Bm), due to occurrence in climatically or edaphically drier locations. It is equivalent to the McLatchie 1 soil association component.
MG3	Podzolic Gray Luvisol	moderately well	Podzolic Gray Luvisol; ferro-humic phase	moderately well	Less common soil has an organic matter enriched, podzolic horizon (Bhf), due to occurrence in climatically or edaphically wetter locations.
MG4	Podzolic Gray Luvisol	moderately well	Orthic Eutric Brunisol, Orthic Humo-Ferric Podzol	moderately well	Less common soils lack clay accumulation horizons due to slightly coarser textures. In drier, warmer locations, they have brunisolic upper horizons (Bm).

* McQUAIGLY Soil Association - MG (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MG5	Podzolic Gray Luvisol	moderately well	Podzolic Gray Luvisol; shallow lithic phase	moderately well to well	Less common soils are 50 to 100 cm thick over bedrock.
MG7	Podzolic Gray Luvisol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
MG8	Podzolic Gray Luvisol	moderately well	Cumulic Humic Regosol; calcareous phase; Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface or subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

RO-YK$_1$
RT$_7$-RO
CQ$_8$

Plate 4.14 Soils in the upper Elk River valley (see text for explanation of symbols).

MELBERT Soil Association - ME

Melbert soils occupy limited areas in the White River and upper Kootenay River drainages of the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Figure 3.5). They have developed in silty to slaty silty morainal (till) deposits derived from phyllitic bedrock (Plate 3.6). The tills are usually >1 m thick and occur on valley floors, valley walls and, to a lesser extent, in mountain summit topography. Slopes usually vary between 10 and 60%, while elevations range from 1800 to 2300 m asl.

Melbert soils are mostly moderately well drained and moderately to slowly pervious. Texture is usually silt loam, but locally, can be very gravelly. Coarse fragment contents are mostly less than 20% but can range to 60% and consist of mostly slaty gravels. A fibrimor forest floor layer up to 12 cm thick usually occurs at the soil surface and overlies a <5 cm thick, light gray (dry), leached horizon (Ae). The leached horizon overlies a 20 to 40 cm thick, yellowish-brown (dry), extremely to strongly acid, podzolized horizon (Bf). Under this is a 10 to 40 cm thick, strong, angular blocky, clay accumulation horizon (Bt, Btk), that, in turn, is underlain by relatively unweathered, mildly alkaline materials (BCk, Ck) at 60 to 70 cm depth. These subsoil materials resemble the clay accumulation horizon in many cases. The usual classification is **Podzolic Gray Luvisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
ME1	Podzolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
ME2	Podzolic Gray Luvisol	moderately well	Brunisolic Gray Luvisol	moderately well to well	Less common soil occurs in climatically or edaphically drier locations and has a brownish-yellow, brunisolic (Bm) upper horizon. It is equivalent to the Moscliffe 1 soil association component.
ME3	Podzolic Gray Luvisol	moderately well	Luvisolic Humo-Ferric Podzol, Podzolic Gray Luvisol; ferro-humic phase	moderately well	Less common soils have organic matter enriched upper horizons (Bhf) due to development in climatically or edaphically wetter locations.
ME4	Podzolic Gray Luvisol	moderately well	Orthic Humo-Ferric Podzol, Orthic Eutric Brunisol	moderately well to well	Less common soils lack a clay accumulation horizon due to slightly coarser textures. On drier, warmer sites they have a light yellowish brown, medium to slightly acid, brunisolic (Bm) upper horizon and are equivalent to the Cedrus 1 soil association component.

MELBERT Soil Association - ME (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
ME5	Podzolic Gray Luvisol	moderately well	Podzolic Gray Luvisol; shallow lithic phase	moderately well to well	Less common soils are 50 to 100 cm thick over bedrock.
ME7	Podzolic Gray Luvisol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
ME8	Podzolic Gray Luvisol	moderately well	Cumulic Humic Regosol; Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Melbert soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Moscliffe soil association.

* MICHEL Soil Association - MY

Michel soils occur in the Fernie Basin, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty sandy fluvial or aeolian veneers that overlie gravelly fluvioglacial and fluvial terraces and fans (Figure 3.7; Plates 3.4, 4.15), derived from areas of limestone, dolomite, sandstone, shale and coal. The parent materials are dark coloured and alkaline. Slopes are usually gentle but locally range up to 30%, while elevations vary between 1050 and 1350 m asl.

Michel soils are generally well drained and moderately pervious. Textures range between silt loam and fine sandy loam (most common) in the upper soil and from very gravelly loam to very gravelly loamy sand in the subsoil. Coarse fragment contents are low near the surface, but increase to as much as 80% in the subsoil, composed mostly of rounded gravels and cobbles. A fibrimor forest floor layer up to 5 cm thick is usually present at the soil surface and overlies a 15 to 30 cm thick solum (Bm, Bmk, BCk) that is strong brown and slightly acid to mildly alkaline. The carbonate enriched, mildly alkaline subsoil(IICk,IICca), beginning at about 30 cm, is characterized by white carbonate coatings on the undersides of coarse fragments and extends to depths that may exceed 1 m. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
MY1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
MY2	Orthic Eutric Brunisol	well	Orthic Melanic Brunisol, Orthic Eutric Brunisol; calcareous phase	well to rapid	Less common soils occur in climatically or edaphically drier locations. They have well developed organic matter enriched surface horizons (Ah) developed under grassy vegetation, or are mildly alkaline to the surface.
MY3	Orthic Eutric Brunisol	well	Orthic Dystric Brunisol	well	Less common soil occurs in climatically or edaphically wetter locations, or on more acidic parent materials. It is strongly acid in the upper solum.
MY4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol	well	Less common soil contains a subsurface clay accumulation horizon (Bt) due to somewhat finer textures.

* MICHEL Soil Association - MY (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MY7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition and is alkaline to the surface.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* MINITOWN Soil Association - MN

Minitown soils occupy limited areas at the higher elevations in the Flathead and Fernie basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly sandy morainal (till) materials which occur on valley floors, valley sides and, to a lesser extent, in rugged mountain summit locations (Plates 3.5, 4.3). The till is generally >1 m thick and derived from non-calcareous sandstone, quartzite and conglomerate. Slopes usually vary between 10 and 60% and elevations range from 1800 to 2300 m asl.

Minitown soils are generally moderately well drained and moderately pervious. Textures range from gravelly loam to very gravelly loamy sand, although gravelly sandy loam is most common. Coarse fragment contents vary between 30 and 60%, and consist of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 12 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, grayish, leached horizon (Ae) which, in turn, overlies a 10 to 25 cm thick, yellowish-brown (dry), extremely to strongly acid, podzolized horizon (Bf). The Bf horizon grades (Bm, BC) to relatively unweathered, extremely to moderately acid parent material (C) at about 40 cm depth. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
MN1	Orthic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
MN2	Orthic Humo-Ferric Podzol	moderately well	Orthic Dystric Brunisol	moderately well to well	Less common soil occurs in climatically or edaphically drier locations. It has a less strongly weathered brunisolic (Bm) surface horizon and is equivalent to the Maiyuk 1 soil association component.
MN3	Orthic Humo-Ferric Podzol	moderately well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils occur in climatically or edaphically wetter locations. They have organic matter enriched upper horizons (Bhf, Ah).
MN4	Orthic Humo-Ferric Podzol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
MN5	Orthic Humo-Ferric Podzol	moderately well	Orthic Humo-Ferric Podzol; shallow lithic phase	moderately well to well	Less common soil is 50 to 100 cm thick over bedrock.
MN7	Orthic Humo-Ferric Podzol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

* MINITOWN Soil Association - MN (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MN8	Orthic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface or subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* MORRISSETTE Soil Association - MO

Morrissette soils occupy limited areas in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in fine to rubbly fine morainal (till) materials derived from friable, usually noncalcareous shale (Plates 3.4, 4.4, 4.15). The till is usually >1 m thick and occurs on valley floors and valley sides. Slopes vary between 10 and 60%, while elevations range between 1350 and 1800 m asl.

Morrissette soils are mostly moderately well drained and slowly to moderately pervious. Textures range from silty clay loam (most common) to silt loam which, locally, may be gravelly. Coarse fragment contents are usually less than 20% but, occasionally, increase to 50% and consist of mostly gravel sized, shaly fragments. A fibrimor forest floor layer up to 10 cm thick generally occurs at the soil surface and overlies a <5 cm thick, often discontinuous, light brownish gray (dry), leached horizon (Ae1). It, in turn, overlies a 10 to 35 cm thick, pale brown (dry), extremely to strongly acid horizon (Bm). This grades (Ae2) to a 10 to 30 cm thick, strong, angular blocky, clay accumulation horizon (Bt) beginning at depths of 30 to 50 cm. It, in turn, grades to a dark grayish brown (dry), medium acid subsoil (BC, C) at about 60 cm. The subsoil generally resembles the clay accumulation horizon. The usual classification is **Brunisolic Gray Luvisol**.

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
MO1	Brunisolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
MO2	Brunisolic Gray Luvisol	moderately well	Orthic Gray Luvisol	moderately well to well	Less common soil occurs in climatically or edaphically drier locations. It is characterized by a grayish, leached surface horizon (Ae) overlying the Bt horizon.
MO3	Brunisolic Gray Luvisol	moderately well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	moderately well	Less common soils have yellowish-brown, podzolized upper horizons (Bf) due to occurrence in climatically or edaphically wetter locations. The second listed is equivalent to the McCorn 1 soil association component.
MO4	Brunisolic Gray Luvisol	moderately well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	moderately well	Less common soils lack a clay accumulation horizon due to slightly coarser textures. On wetter, cooler sites, they may have podzolized upper horizons (Bf). The first listed is equivalent to the Cokato 1 soil association component.

* MORRISSETTE Soil Association - MO (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MO5	Brunisolic Gray Luvisol	moderately well	Brunisolic Gray Luvisol; shallow lithic phase	well to moderately well	Less common soil is 50 to 100 cm thick over bedrock.
MO7	Brunisolic Gray Luvisol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
MO8	Brunisolic Gray Luvisol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

Plate 4.15 Soils in the Elk River valley at Cokato (see text for explanation of symbols).

* MORRO MOUNTAIN Soil Association - MP

Morro Mountain soils occur at the rugged, upper elevations of the Rocky and Purcell mountains, within the krummholz subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly silty morainal (till) deposits in high elevation valleys. The till is generally >1 m thick and has been derived from predominantly calcareous bedrocks. Slopes vary widely and range from 10 to 100%, while elevations fall between 2300 and 2450 m asl. Active nivation, solifluction and cryoturbation are locally evident.

Morro Mountain soils are mostly moderately well drained, but locally vary from well to imperfect. Perviousness varies from moderate to rapid, depending on the amounts of coarse fragments present. Textures are variable, ranging from gravelly silt loam (most common) to very gravelly loamy sand in localized areas. Coarse fragment contents vary from 30 to 70%, and consist of angular and subangular gravels, cobbles and stones. A fibrimor forest floor layer up to 15 cm thick is usually present at the soil surface. Under this is a 10 to 20 cm thick, yellowish-brown, extremely to moderately acid, organic matter enriched and podzolized horizon (Bhf). This, in turn, is usually underlain by a relatively thin Bf or Bm horizon that grades (BCk) to neutral or moderately alkaline, relatively unweathered parent material (Ck) at about 50 cm. The usual classification is **Orthic Ferro-Humic Podzol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
MP1	Orthic Ferro-Humic Podzol	moderately well			Consists dominantly of the most common soil as described above.
MP2	Orthic Ferro-Humic Podzol	moderately well	Orthic Humo-Ferric Podzol	moderately well to well	Less common soil lacks organic matter enriched upper horizons due to occurrence in climatically or edaphically drier locations. It is equivalent to the Marconi 1 soil association component.
MP3	Orthic Ferro-Humic Podzol	moderately well	Sombric Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well to imperfect	Less common soils have well developed, organic matter enriched surface horizons (Ah) due to occurrence in moist meadows between krummholz tree patches.
MP4	Orthic Ferro-Humic Podzol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures. It is equivalent to the McKay Mountain 1 soil association component.
MP5	Orthic Ferro-Humic Podzol	moderately well	Orthic Humo-Ferric Podzol; shallow lithic phase	moderately well to well	Less common soil is 50 to 100 cm thick over bedrock.

* MORRO MOUNTAIN Soil Association - MP (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MP7	Orthic Ferro-Humic Podzol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
MP8	Orthic Ferro-Humic Podzol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well to imperfect	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.
MP9	Orthic Ferro-Humic Podzol	moderately well to well	Orthic Eutric Brunisol, Orthic Dystric Brunisol	moderately well to well	Less common soils have weak solum development (Bm) due to relatively recent erosion or deposition.
MP10	Orthic Ferro-Humic Podzol	moderately well	Orthic Melanic Brunisol, Orthic Sombric Brunisol	well to rapid	Less common soils have turfy, organic matter enriched surface horizons (Ah) developed under grassy vegetative cover. Subsurface horizons (Bm) are weakly developed.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* MOSCLIFFE Soil Association - MW

Moscliffe soils occupy limited areas in the White and upper Kootenay river drainages of the Rocky Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in silty to slaty silty morainal (till) deposits derived from phyllitic bedrock (Plates 3.6, 4.6). The till is usually >1 m thick and most commonly occurs on valley floors and lower valley sides. Slopes vary between 10 and 60%, while elevations range between 1350 and 1800 m asl.

Moscliffe soils are mostly moderately well drained and moderately to slowly pervious. Texture is usually silt loam, but locally can be very gravelly. Coarse fragment contents are mostly less than 20%, but sometimes increase to 60% and consist of slaty, mostly gravel sized fragments. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a <5 cm thick, discontinuous, grayish, leached horizon (Ae). It, in turn, overlies a 10 to 20 cm thick, brownish-yellow (dry), strongly acid horizon (Bm). This grades to a 15 to 25 cm thick, strong angular blocky clay accumulation horizon (Bt, Btk) beginning at about 40 cm depth. It, in turn, grades to mildly or moderately alkaline, relatively unweathered parent material (Ck) at about 60 cm depth. The usual classification is **Brunisolic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
MW1	Brunisolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
MW2	Brunisolic Gray Luvisol	moderately well	Orthic Gray Luvisol	moderately well to well	Less common soil occurs in climatically or edaphically drier locations. It is characterized by a grayish, leached surface horizon (Ae) overlying the Bt horizon.
MW3	Brunisolic Gray Luvisol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil has a yellowish-brown (dry), podzolized upper horizon (Bf) and occurs in climatically or edaphically wetter locations. It is equivalent to the Melbert 1 soil association component.
MW4	Brunisolic Gray Luvisol	moderately well	Orthic Eutric Brunisol	moderately well	Less common soil lacks a clay accumulation horizon (Bt) due to slightly coarser textures. It is equivalent to the Cedrus 1 soil association component.
MW5	Brunisolic Gray Luvisol	moderately well	Brunisolic Gray Luvisol; shallow lithic phase	moderately well to well	Less common soil is 50 to 100 cm thick over bedrock.

* MOSCLIFFE Soil Association - MW (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MW7	Brunisolic Gray Luvisol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
MW8	Brunisolic Gray Luvisol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed, due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* MOUNT MIKE Soil Association - MM

Mount Mike soils are relatively common in the Rocky and Purcell mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly silty morainal (till) materials occupying the floors and sides of mountain valleys (Plates 3.3, 4.4). The till is usually >1 m deep and derived from calcareous bedrocks. Slopes vary between 10 and 60%, while elevations range between 1350 and 1800 m asl.

Mount Mike soils are mostly moderately well drained and moderately to slowly pervious. Texture is most commonly silt loam, but locally may be gravelly to very gravelly. Coarse fragment contents range between 20 and 60% and consist of mostly subangular and subrounded gravels, with some cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and overlies a <5 cm thick, light gray, leached horizon (Ae). The leached horizon overlies a 10 to 20 cm thick, light yellowish brown (dry), medium to slightly acid horizon (Bm). This grades (Ae2) to a 10 to 20 cm thick, strong, angular blocky, clay accumulation horizon (Bt) beginning at about 30 cm depth. Mildly to moderately alkaline parent material (Cca, Ck), somewhat resembling the clay accumulation horizon, is encountered at depths around 60 cm. Some carbonate coatings on the undersides of coarse fragments are evident in the subsoil, but are not as prevalent as those in the soils located at lower elevations. The usual classification is **Brunisolic Gray Luvisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
MM1	Brunisolic Gray Luvisol	moderately well			Consists dominantly of the most common soil as described above.
MM2	Brunisolic Gray Luvisol	moderately well	Orthic Gray Luvisol	moderately well to well	Less common soil occurs in climatically or edaphically drier locations. It is characterized by a pale brown (dry), leached surface horizon (Ae) overlying the Bt horizon and is equivalent to the Kinbasket 1 soil association component.
MM3	Brunisolic Gray Luvisol	moderately well	Podzolic Gray Luvisol	moderately well	Less common soil occurs in climatically or edaphically wetter locations and has a yellowish-brown (dry), podzolized upper horizon (Bf). It is equivalent to the McKay Mountain 1 soil association component.

* MOUNT MIKE Soil Association - MM (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
MM4	Brunisolic Gray Luvisol	moderately well	Orthic Eutric Brunisol, Orthic Humo-Ferric Podzol	moderately well to well	Less common soils lack a clay accumulation horizon due to slightly coarser textures. On wetter, cooler sites they are characterized by yellowish-brown, podzolic upper horizons (Bf). They ar respectively equivalent to the Spillimacheen 1 and Marconi 1 soil association components.
MM5	Brunisolic Gray Luvisol	moderately well	Brunisolic Gray Luvisol; shallow lithic phase	moderately well to well	Less common soil is 50 to 100 cm thick over bedrock.
MM7	Brunisolic Gray Luvisol	moderately well	Orthic Regosol; calcareous phase	moderately well	Less common soil lacks soil development due to recent disturbance and/or deposition.
MM8	Brunisolic Gray Luvisol	moderately well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* MURDOCK Soil Association - MZ

Murdock soils occupy limited areas in the Elk and Flathead river drainages of the Rocky Mountains. They occur within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone and have developed in gravelly silty morainal (till) deposits on valley floors and sides (Figure 3.7). The till is usually >1 m thick and is derived from calcareous, often dark coloured, sandstone or intermixed sandstone and limestone. Slopes usually vary between 10 and 60%, while elevations range from 1050 to 1350 m asl.

Murdock soils are mostly well drained and moderately to slowly pervious. The usual texture is gravelly or very gravelly silt loam. Coarse fragment contents range between 20 and 60%, and consist of mostly subangular and subrounded gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 4 cm thick occurs at the soil surface. It overlies a 20 to 30 cm thick, pale brown (dry), medium to slightly acid, leached (Ae) horizon, that grades (AB) to a 20 to 40 cm thick, strong, angular blocky, clay accumulation horizon (Bt). It, in turn, grades (Bmk) to mildly or moderately alkaline parent material (Cca, Ck) at about 70 cm depth. The parent material is characterized by white carbonate coatings on the undersides of coarse fragments. The usual classification is **Orthic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
MZ1	Orthic Gray Luvisol	well			Consists dominantly of the most common soil as described above.
MZ2	Orthic Gray Luvisol	well	Orthic Eutric Brunisol	well to rapid	Less common soil has a light light yellowish brown (dry), medium to slightly acid surface horizon (Bm), but lacks a clay accumulation horizon. It occurs in climatically or edaphically drier locations.
MZ3	Orthic Gray Luvisol	well	Brunisolic Gray Luvisol	moderately well	Less common soil has a yellowish brown (dry), surface horizon (Bm), and occurs in climatically or edaphically wetter locations. It is equivalent to the McLatchie 1 soil association component.
MZ5	Orthic Gray Luvisol	well	Orthic Gray Luvisol; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.
MZ7	Orthic Gray Luvisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* NOWITKA Soil Association - NW

Nowitka soils occur on the floor of the Rocky Mountain Trench, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty sand to sandy floodplain deposits derived from areas where phyllite, limestone and dolomite predominate (Figure 3.1). Slopes are usually <2%, while elevations are mostly in the vicinity of 800 m asl.

Nowitka soils are mainly imperfectly to poorly drained and moderately pervious. Textures range from silt loam (most common) to fine sandy loam. Coarse fragments are usually absent. The usual solum colour is yellowish-brown, with strong brown mottles common near the mineral soil surface. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil.

Most Nowitka soils have insignificant soil development due to periodic flooding and surface additions of new material. Water tables are near the soil surface for significant periods of the year. A rhizomull layer up to 10 cm thick consisting of plant litter overlies a thin, mildly alkaline, organic matter enriched mineral horizon (Ahk) at the soil surface. These overlie weakly gleyed, mildly to moderately alkaline subsurface horizons (Cgjk). The usual classification is **Gleyed Cumulic Regosol; calcareous phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
NW1	Gleyed Cumulic Regosol; calcareous phase	imperfect			Consists dominantly of the most common soil as described above.
NW2	Gleyed Cumulic Regosol; calcareous phase	imperfect	Cumulic Regosol; calcareous phase	moderately well	Less common soil occupies slightly higher, better drained areas, or has slightly coarser textures and drains more rapidly than the most common soil.
NW3	Gleyed Cumulic Regosol; calcareous phase	imperfect	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Less common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surfaces (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.
NW11	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Gleyed Cumulic Regosol; calcareous phase	imperfect	Most common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surfaces (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Nowitka soils.

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* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* ODLUMBY Soil Association - OD

Odlumby soils occupy wet, depressional areas throughout the Rocky and Purcell mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in deep organic accumulations, most often located on broad floodplains (Figure 3.2; Plate 4.8). The organic deposits are generally greater than 160 cm thick, have level or gently sloping surfaces, and occur at elevations between 1800 and 2300 m asl.

Odlumby soils are very poorly drained with the water table at, or near, the surface for most of the year. They are primarily mesic (partly decomposed) in the middle tier (40 to 120 cm depth), although thin fibric or humic layers, or thin mineral lenses are also often present. Odlumby soils most commonly consist of a 10 to 40 cm thick, relatively undecomposed upper layer composed of a mixture of moss, sedge and reed remains (Of), underlain by a 110 to 200+ cm thick zone of partially decomposed organic material (Om). Colours are usually black to very dark brown (moist) but, particularly in the Of horizon, may grade to yellowish-brown (moist). Reactions mostly vary from medium acid to neutral, but in calcareous bedrock areas, may range to mildly alkaline. The usual classification is **Typic Mesisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
OD1	Typic Mesisol	very poor			Consists dominantly of the most common soil as described above.
OD10	Typic Mesisol	very poor	Typic Fibrisol	very poor	Less common soil has a predominantly fibric middle tier (Of) (40 - 120 cm).
OD11	Typic Mesisol	very poor	Terric Mesisol, Rego Gleysol; calcareous phase	very poor	Less common soils have organic surface horizons (Om) <160 cm thick overlying strongly gleyed mineral material. The organic surface is not present in some locations.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* OLIVIA Soil Association - OL

Olivia soils occur in wet depressional areas in the Rocky Mountain Trench and adjacent valleys in the Rocky and Purcell mountains, within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in organic accumulations composed of sedge and reed (fen) vegetation which are sometimes located on floodplains (Figure 3.1; Plate 3.7). The deposits are generally >160 cm thick, have level to gently sloping surfaces and are limited to elevations between 700 to 1050 m asl.

Olivia soils are very poorly drained with the water table at, or near, the surface for most of the year. They are primarily mesic (partially decomposed) in their middle tier (40 - 120 cm), although thin fibric or humic layers, or thin mineral lenses are often evident. Olivia soils consist of a 10 to 40 cm thick, relatively undecomposed upper layer derived from sedges and reeds (Of) underlain by a 110 to 200+ cm thick zone of partially decomposed (mesic) organic material (Om). Soil colours are generally black to very dark brown (moist) but, particularly in the Of horizon, commonly grade to yellowish-brown (moist). Reaction is neutral or mildly alkaline. The usual classification is **Typic Mesisol.**

Soil	Most Common Soil		Less Common Soil		
Assoc. Component	Classification	Drainage	Classification	Drainage	Comments
OL1	Typic Mesisol	very poor			Consists dominantly of the most common soil as described above.
OL11	Typic Mesisol	very poor	Terric Mesisol, Rego Gleysol; calcareous phase	very poor	Less common soils have organic surface horizons (Om) <160 cm thick overlying strongly gleyed mineral material. The organic surface is not present in some locations

The Olivia soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Olsonite soil association.

* OLSONITE Soil Association - OS

Olsonite soils occur in wet, depressional areas in the Rocky Mountain Trench and adjacent valleys in the Rocky and Purcell mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in organic deposits of sedge and reed origin occupying small fens or, sometimes, portions of floodplains (Figure 3.7). The deposits are generally >160 cm thick, have level to gently sloping surfaces, and occur between 1050 and 1350 m asl.

Olsonite soils are very poorly drained, with the water table at, or near, the surface for most of the year. They are primarily mesic (partially decomposed) in the middle tier (40 - 120 cm), although thin fibric or humic layers, or thin mineral lenses are often evident. Olsonite soils usually consist of a 10 to 40 cm thick, relatively undecomposed (Of) upper layer of sedge and reed origin, underlain by a 110 to 200+ cm thick zone of partially decomposed (mesic) organic material (Om). Soil colors are usually black to very dark brown (moist), but particularly in the Of horizon, may sometimes be yellowish-brown (moist). Reactions mostly commonly range between medium acid and neutral, but on floodplains in calcareous bedrock areas, the reaction may be mildly alkaline. The usual classification is **Typic Mesisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
OS1	Typic Mesisol	very poor			Consists dominantly of the most common soil as described above.
OS11	Typic Mesisol	very poor	Terric Mesisol, Rego Gleysol; calcareous phase	very poor	Less common soils have organic surface horizons (Om) <160 cm thick overlying strongly gleyed mineral material. The organic surface may be missing in some locations.

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* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* O'NEILL Soil Association - ON

O'Neill soils occupy wet, depressional areas throughout the Rocky and Purcell mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in organic fen deposits consisting of mostly sedge and reed remains, often located on broad floodplains (Figure 3.8, Plates 3.6; 4.7). The deposits are generally greater than 160 cm thick, have level to gently sloping surfaces, and occur at elevations between 1350 and 1800 m asl.

O'Neill soils are very poorly drained with the water table at, or near, the surface for most of the year. They are primarily mesic (partially decomposed) in the middle tier (40 - 120 cm), although relatively thin fibric or humic layers, or thin, mineral lenses, are often evident. They most commonly consist of a 10 to 40 cm thick layer of relatively undecomposed sedge or reed remains (Of) at the soil surface, underlain by 110 to 200+ cm of partially decomposed (mesic) organic material (Om). Soil colours are usually black to very dark brown (moist), but particularly in the Of horizon, may grade to yellowish-brown (moist). Reactions are usually medium acid to neutral, but on floodplains in calcareous bedrock areas, may range to mildly alkaline. The usual classification is **Typic Mesisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
ON1	Typic Mesisol	very poor			Consists dominantly of the most common soil as described above.
ON9	Typic Mesisol	very poor	Typic Fibrisol	very poor	Less common soil has a predominantly fibric (Of) middle tier (40 - 120 cm).
ON11	Typic Mesisol	very poor	Terric Mesisol, Rego Gleysol; calcareous phase	very poor	Less common soils have organic surface horizons (Om) <160 cm thick overlying strongly gleyed mineral material. The organic surface may be missing in some locations.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* PLUMBOB Soil Association - P

Plumbob soils occur in the drier portions of the Rocky Mountain Trench, under grassland or cultivated vegetative cover, within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir - Forest Zone. They have developed in gravelly silty morainal materials (till) located on the valley floor (Plates 3.1, 4.16). The till is generally >1 m thick and has been derived from areas of calcareous bedrocks. Slopes usually vary between 10 and 60%, while elevations range between 700 and 1050 m asl.

Plumbob soils are well drained and moderately pervious. Texture is most commonly silt loam or gravelly silt loam, but may vary to as coarse as very gravelly loam. Coarse fragment contents range between 20 and 60% and consist of subrounded and subangular gravels with lesser cobbles and stones. A dark brown (dry), organic matter enriched surface horizon (Ah) extends to depths of 10 to 25 cm or deeper if cultivated. It is underlain by a 5 to 15 cm thick, brown, slightly acid brunisolic horizon (Bm). A carbonate enriched and cemented, mildly to moderately alkaline subsoil (Cca, Ck), characterized by white coatings on the undersides of coarse fragments, extends from the base of the solum to depths in excess of 1 m. The usual classification is **Orthic Dark Brown.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
P1	Orthic Dark Brown	well			Consists dominantly of the most common soil as described above.
P3	Orthic Dark Brown	well	Orthic Eutric Brunisol, Orthic Melanic Brunisol	well	Less common soils have less well developed organic matter enriched surface soil horizons, but otherwise resemble the most common soil. Those in which the organic matter enriched surface is <10 cm thick are equivalent to the Wycliffe 1 soil association component.
P4	Orthic Dark Brown	well	Orthic Gray Luvisol	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures. It is equivalent to the Kinbasket 1 soil association component.
P5	Orthic Dark Brown	well	Orthic Dark Brown; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.
P7	Orthic Dark Brown	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* PLUMBOB Soil Association - P (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
P9	Orthic Dark Brown	well	Orthic Eutric Brunisol; calcareous phase	well	Less common soil lacks a well developed organic matter enriched surface horizon and is alkaline to the surface.
P10	Orthic Dark Brown	well	Calcareous Dark Brown	well	Less common soil is alkaline throughout, but otherwise resembles the most common soil.
P11	Orthic Dark Brown	well	Orthic Dark Brown; saline phase, Dark Brown Solonetz	well to moderately well	Less common soils are saline and some contain organic matter stained, hard subsurface columnar peds (Bnt).

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

Plate 4.16 Chernozemic soils near Roosville (see text for explanation of symbols).

* RACEHORSE Soil Association - RR

Racehorse soils occupy limited areas in the Fernie and Flathead basins, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly fine colluvial materials derived from friable, usually non-calcareous shale (Plates 3.4, 4.4). The colluvium is usually <1 m thick and occurs on 30 to 100% slopes. Elevations range from 1350 to 1800 m asl.

Racehorse soils are mostly well drained and moderately pervious. Textures range from silt loam to very gravelly silt loam, with gravelly silt loam being most common. Coarse fragment contents usually range between 20 and 90% and consist of mostly shaly gravels. A fibrimor forest floor layer up to 4 cm thick generally occurs at the soil surface. It overlies a 15 to 30 cm thick, dark yellowish brown, extremely to strongly acid horizon (Bm). This grades to very dark grayish brown, very strongly to slightly acid parent material (C) at depths of about 50 cm. Bedrock occurs at depths between 50 and 100 cm. The usual classification is **Orthic Dystric Brunisol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RR1	Orthic Dystric Brunisol; shallow lithic phase	well			Consists dominantly of the most common soil as described above.
RR2	Orthic Dystric Brunisol; shallow lithic phase	well	Orthic Eutric Brunisol; shallow lithic phase	well	Less common soil has thinner, medium to mildly acid upper horizons due to occurrence in climatically or edaphically drier locations, or on less acidic parent material.
RR3	Orthic Dystric Brunisol; shallow lithic phase	well	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Less common soil has a podzolized upper horizon (Bf) due to occurrence in climatically or edaphically wetter locations. It is equivalent to the Roth Creek 1 soil association component.
RR4	Orthic Dystric Brunisol; shallow lithic phase	well	Brunisolic Gray Luvisol; shallow lithic phase	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
RR5	Orthic Dystric Brunisol; shallow lithic phase	well	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.

* RACEHORSE Soil Association - RR (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RR6	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	well	Most common soil is 20 to 50 cm thick over bedrock. The less common soil is as described for Racehorse soils.
RR7	Orthic Dystric Brunisol; shallow lithic phase	well	Orthic Regosol; shallow lithic phase	well	Less common soil lacks soil development due to recent disturbance or deposition.
RR8	Orthic Dystric Brunisol; shallow lithic phase	well	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* RADIUM Soil Association - RA

Radium soils occur in both the Rocky and Purcell mountains, within the krummholz subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial materials usually <1 m thick and derived from a variety of calcareous bedrocks (Plates 3.3, 4.17). Slopes in the rugged mountain topography vary from 60 to 100%, while elevations range between 2300 and 2450 m asl. Active nivation, solifluction and cryoturbation are locally evident.

Radium soils are moderately to rapidly pervious and mostly well drained, but locally, soil drainage can vary from rapid to imperfect. The usual textures are gravelly or very gravelly silt loam, but locally, can sometimes be as coarse as very gravelly loamy sand. Coarse fragment contents range from 30 to 90% and consist of mostly angular gravels with lesser cobbles and stones. The surface horizon under relatively open canopied, stunted krummholz forest is usually a 5 to 15 cm thick, turfy, organic matter enriched horizon (Ah). Under this is a 10 to 20 cm thick, dark brown, extremely to strongly acid, podzolized horizon (Bf) which gradually grades (Bm) to neutral to moderately alkaline parent material (Ck) at about 35 cm depth. Bedrock occurs at depths between 50 and 100 cm. The most commonly occurring soil development is **Sombric Humo-Ferric Podzol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RA1	Sombric Humo-Ferric Podzol; shallow lithic phase	well			Consists dominantly of the most common soil as described above.
RA2	Sombric Humo-Ferric Podzol; shallow lithic phase	well	Orthic Humo-Ferric Podzol; shallow lithic phase	well to rapid	Less common soil lacks organic matter enriched upper horizons due to occurrence in climatically or edaphically drier locations. It is equivalent to Ruault 1 soil association component.
RA3	Sombric Humo-Ferric Podzol; shallow lithic phase	well	Sombric Ferro-Humic Podzol; shallow lithic phase, Gleyed Humo-Ferric Podzol; shallow lithic phase	moderately well to imperfect	Less common soils are subject to seepage and/or perched water tables for most of the growing season.
RA5	Sombric Humo-Ferric Podzol; shallow lithic phase	well	Sombric Humo-Ferric Podzol; very shallow lithic phase	well to rapid	Less common soil is 20 to 50 cm thick over bedrock.
RA6	Sombric Humo-Ferric Podzol; very shallow lithic phase	well to rapid	Sombric Humo-Ferric Podzol; shallow lithic phase	well	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Radium soils.

* RADIUM Soil Association - RA (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RA7	Sombric Humo-Ferric Podzol; shallow lithic phase	well	Orthic Regosol; calcareous, shallow lithic phase	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
RS8	Sombric Humo-Ferric Podzol; shallow lithic phase	well	Cumulic Humic Regosol; calcareous, shallow lithic phase, Orthic Regosol; calcareous, shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.
RS9	Sombric Humo-Ferric Podzol; shallow lithic phase	well	Orthic Eutric Brunisol; shallow lithic phase, Orthic Dystric Brunisol; shallow lithic phase	well	Less common soils have weak solum development (Bm) due to relatively recent erosion or deposition.
RA10	Sombric Humo-Ferric Podzol; shallow lithic phase	well	Orthic Melanic Brunisol; shallow lithic phase, Orthic Sombric Brunisol; shallow lithic phase	well to imperfect	Less common soils have well developed, turfy, organic matter enriched surface horizons (Ah) developed under grassy vegetative cover. Subsurface horizons are weakly developed.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* RAINBOWL Soil Association - RG

Rainbowl soils occur in the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial materials usually <1 m thick and derived from fine to medium grained, non-calcareous bedrocks (Plates 3.2, 4.1). Slopes are steep, generally well in excess of 30%, while elevations range between 1800 and 2300 m asl.

Rainbowl soils are usually rapidly drained and rapidly pervious. Textures range from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment contents vary between 30 and 90% and consist mostly of slaty gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 10 cm thick occurs at the soil surface and overlies a <5 cm thick, light brownish gray (dry), leached horizon (Ae). The Ae overlies a 20 to 30 cm thick, yellowish-brown (dry), very strongly to strongly acid, podzolized horizon (Bf), which grades (Bm, BC) to relatively unweathered, very strongly to strongly acid parent material (C) at about 50 cm depth. Bedrock occurs at depths between 50 and 100 cm. The usual classification is **Orthic Humo-Ferric Podzol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RG1	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RG2	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Less common soil has a thinner, light yellowish brown, weakly podzolized upper horizon (Bm) due to occurrence in climatically or edaphically drier locations. It is equivalent to the Roche Mountain 1 soil association component.
RG3	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Ferro-Humic Podzol; shallow lithic phase, Sombric Humo-Ferric Podzol; shallow lithic phase	well to moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
RG4	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Podzolic Gray Luvisol; shallow lithic phase	well to rapid	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures.
RG5	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; very shallow lithic phase	well to rapid	Less common soil is 20 to 50 cm thick over bedrock.

* RAINBOWL Soil Association - RG (Continued)

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RG6	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Rainbowl soils.
RG7	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
RG8	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks or in run-out zones. They may have organic matter enriched surface or subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* RIDGE RANGE Soil Association - RD

Ridge Range soils occupy limited areas in the Elk and Flathead river drainages of the Rocky Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly sandy colluvial materials, usually <1 m thick and derived from calcareous sandstone, or mixed sandstone and limestone (Plate 3.4). Slopes are usually well in excess of 30%, while elevations range between 1350 and 1800 m asl.

Ridge Range soils are generally rapidly drained and rapidly pervious. Textures range between gravelly loam and very gravelly loamy sand, with gravelly sandy loam being most common. Coarse fragment contents vary from 30 to 90% and consist mainly of angular gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface. It overlies a 5 to 20 cm thick, strong brown to yellowish-brown, medium to mildly acid horizon (Bm), that grades (BC, BCk) to slightly acid to moderately alkaline parent material (C, Ck) at about 50 cm depth. Bedrock occurs at depths between 50 and 100 cm. The usual classification is **Orthic Eutric Brunisol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RD1	Orthic Eutric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RD2	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Melanic Brunisol; shallow lithic phase, Orthic Eutric Brunisol; calcareous, shallow lithic phase	rapid	Less common soils have an organic matter enriched surface (Ah) or are calcareous to the surface. They occur in climatically or edaphically drier locations dominated by grassy vegetation.
RD3	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase, Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Less common soils have thicker, strongly to medium acid upper horizons (Bm, Bf) due to occurrence in climatically or edaphically wetter locations, or on more acidic parent material. The podzolic soil is equivalent to the Rourke 1 soil association component.
RD4	Orthic Eutric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase	rapid to well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.

* RIDGE RANGE Soil Association - RD (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RD5	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
RD6	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. The most common soil is as described for Ridge Range soils.
RD7	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Regosol; calcareous, shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
RD8	Orthic Eutric Brunisol; shallow lithic phase	rapid	Cumulic Humic Regosol; calcareous, shallow lithic phase, Orthic Regosol; calcareous, shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise lack soil development due to recent erosion or deposition.

* A detailed soil description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* RIVER RUN Soil Association - RI

River Run soils occur in the White and upper Kootenay river drainages of the Rocky Mountains within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in slaty silty colluvium derived from phyllitic bedrock (Plate 4.11). The materials are generally <1 m thick and occur on slopes between 30 and 100%. Elevations range between 1050 and 1350 m asl.

River Run soils are generally well drained and moderately pervious. Textures range from silt loam (most common) to very gravelly silt loam. Coarse fragment contents are usually less than 25%, but locally may range as high as 80% and consist mostly of slaty gravel. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and overlies a 5 to 30 cm thick, light yellowish brown, strongly to medium acid horizon (Bm). Under this a weakly developed clay accumulation horizon (Btj) may be present which grades to relatively unweathered, strongly to medium acid parent material (C) at about 40 cm depth. Bedrock occurs at depths between 50 and 100 cm. River Run soils are transitional to Luvisols, but lacking well developed clay accumulation horizons in the subsurface, are classified as **Orthic Eutric Brunisol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
RI1	Orthic Eutric Brunisol; shallow lithic phase	well			Consists dominantly of the most common soil as described above.
RI2	Orthic Eutric Brunisol; shallow lithic phase	well	Orthic Melanic Brunisol; shallow lithic phase, Orthic Eutric Brunisol; calcareous, shallow lithic phase	well to rapid	Less common soils have a well developed organic matter enriched surface horizons (Ah) or are calcareous to the surface. They occur in climatically or edaphically drier locations dominated by grassy vegetation.
RI3	Orthic Eutric Brunisol; shallow lithic phase	well	Orthic Dystric Brunisol; shallow lithic phase	well	Less common soil occurs in climatically or edaphically wetter areas, or on more acidic parent materials. It has a deeper, very strongly to strongly acid upper horizon (Bm) and is equivalent to the Russette 1 soil association component.
RI4	Orthic Eutric Brunisol; shallow lithic phase	well	Brunisolic Gray Luvisol; shallow lithic phase, Orthic Gray Luvisol; shallow lithic phase	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. On drier sites they may lack a Bm horizon.

* RIVER RUN Soil Association - RI (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RI5	Orthic Eutric Brunisol; shallow lithic phase	well	Orthic Eutric Brunisol; very shallow lithic phase	rapid to well	Less common soil is 20 to 50 cm thick over bedrock.
RI6	Orthic Eutric Brunisol; very shallow lithic phase	rapid to well	Orthic Eutric Brunisol; shallow lithic phase	well	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for River Run soils.
RI7	Orthic Eutric Brunisol; shallow lithic phase	well	Orthic Regosol; shallow lithic phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

ROBERT CREEK Soil Association - RC

Robert Creek soils occupy limited areas in the Elk and Flathead river drainages of the Rocky Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone (Figure 3.7). They have developed in rubbly sandy colluvial materials usually <1 m thick and derived from calcareous sandstone or mixed sandstone and limestone. Slopes are steep, usually well in excess of 30%, and elevations range from 1050 to 1350 m asl.

Robert Creek soils are generally rapidly drained and rapidly pervious. Textures range between gravelly loam and very gravelly loamy sand, with gravelly sandy loam being most common. Coarse fragment contents vary between 30 and 90% and consist of mainly angular gravels with lesser amounts of cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface. It overlies a 5 to 20 cm thick, light yellowish brown (dry), medium to slightly acid horizon (Bm), that grades (Bmk, BCk) to a moderately alkaline, carbonate enriched parent material (Cca, Ck) at about 20 to 40 cm depth. The parent material is characterized by white carbonate coatings on the undersides of coarse fragments. Bedrock occurs at 50 to 100 cm depth. The usual classification is **Orthic Eutric Brunisol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RC1	Orthic Eutric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RC2	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Melanic Brunisol; shallow lithic phase, Orthic Eutric Brunisol; calcareous, shallow lithic phase	rapid	Less common soil have a well developed, organic matter enriched surface horizon (Ah), or are calcareous to the surface, due to occurrence in climatically or edaphically drier locations dominated by grassy vegetation.
RC3	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Less common soil has a deeper, yellowish-brown, very strongly to strongly acid upper horizon (Bm) due to occurrence in climatically or edaphically drier locations, or on less basic parent materials.
RC4	Orthic Eutric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase	rapid to well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.

ROBERT CREEK Soil Association - RC (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RC5	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
RC6	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Robert Creek soils.
RC7	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Regosol; calcareous, shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.

The Robert Creek soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Ridge Range soil association.

* ROCHE MOUNTAIN Soil Association - RH

Roche Mountain soils occur in the Rocky Mountains, within the Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Figure 3.8). They have developed in rubbly colluvial materials generally <1 m thick and derived from non-calcareous, medium to fine grained bedrocks (Plates 4.1, 4.18). The steep slopes are usually well in excess of 30%, while elevations range from 1350 to 1800 m asl.

Roche Mountain soils are generally rapidly drained and rapidly pervious. Textures vary from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment contents range between 30 and 90% and consist of slaty gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface. It overlies a 20 to 40 cm thick, light yellowish brown, very strongly to strongly acid horizon (Bm), that grades (BC) to relatively unweathered, very strongly acid parent material (C) at about 50 cm depth. Bedrock occurs at depths between 50 and 100 cm. The usual classification is **Orthic Dystric Brunisol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RH1	Orthic Dystric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RH2	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically drier locations, or on somewhat less acidic parent materials. It has a shallower, medium to slightly acid upper horizon (Bm).
RH3	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid to well	Less common soil occurs in climatically or edaphically wetter locations and has a podzolized upper (Bf) horizon. It is equivalent to the Rainbowl 1 soil association component.
RH4	Orthic Dystric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase	rapid to well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.
RH5	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.

* ROCHE MOUNTAIN Soil Association - RH (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RH6	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. The less common soil is as described for Roche Mountain soils.
RH7	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Regosol: shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.
RH8	Orthic Dystric Brunisol; shallow lithic phase	rapid	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may contain organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent deposition or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* ROCKBLUFF Soil Association - RB

Rockbluff soils occur in the Rocky Mountain Trench and in a few adjacent valleys in the Rocky and Purcell mountains, within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone (Figure 3.1; Plate 3.1). They have developed in rubbly colluvial materials derived from calcareous bedrocks. The colluvial materials are usually <1 m deep and occur on 30 to 100% slopes. Elevations range between 700 and 1050 m asl.

Rockbluff soils are generally rapidly drained and rapidly pervious. Textures are variable and range from gravelly silt loam (most common) to very gravelly loam sand. Coarse fragment contents vary between 30 and 90% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface. It overlies a 5 to 15 cm thick, brown to light yellowish brown (dry), medium acid to neutral horizon (Bm) which grades (Bmk, BCk) to mildly or moderately alkaline, carbonate enriched parent material (Cca, Ck) at about 40 cm depth. The parent material is characterized by the presence of white carbonate coatings on the undersides of coarse fragments. Bedrock occurs at 50 to 100 cm depth. The usual classification is **Orthic Eutric Brunisol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RB1	Orthic Eutric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RB2	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Dark Brown; shallow lithic phase, Orthic Melanic Brunisol; shallow lithic phase	rapid	Less common soils have well developed organic matter enriched surface horizons (Ah) due to occurrence in climatically or edaphically drier locations under mainly grassy vegetation.
RB4	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Gray Luvisol; shallow lithic phase	well	Less common soil contains a clay accumulation horizon (Bt) due to slightly finer textures.
RB5	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
RB6	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Rockbluff soils.

* ROCKBLUFF Soil Association - RB (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RB7	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Regosol; calcareous, shallow lithic phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* ROCK CLEFT Soil Association - RE

Rock Cleft soils occupy limited areas at lower elevations in the Fernie Basin, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir - Forest Zone. They have developed in rubbly fine colluvial materials generally <1 m thick and derived from friable, usually non-calcareous shale. Slopes vary between 30 and 100%, while elevations range from 1050 to 1350 m asl.

Rock Cleft soils are mostly well drained and moderately pervious. Textures range from silt loam to very gravelly silt loam, with gravelly silt loam being most common. Coarse fragment contents range from 20 to 90% and are mostly shaly gravels. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and overlies a 15 to 30 cm thick, pale brown to light yellowish brown, strongly to medium acid horizon (Bm). This grades to very dark grayish brown, slightly acid parent material (C) at about 50 cm depth. Bedrock occurs at depths between 50 and 100 cm. The usual classification is **Orthic Eutric Brunisol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RE1	Orthic Eutric Brunisol; shallow lithic phase	well			Consists dominantly of the most common soil as described above.
RE2	Orthic Eutric Brunisol; shallow lithic phase	well	Orthic Eutric Brunisol; calcareous, shallow lithic phase, Orthic Melanic Brunisol;	well	Less common soils occur in climatically or edaphically drier locations or have developed on calcareous shales. They may be calcareous to the surface, or under mainly grassy vegetation, may have a well developed organic matter enriched surface horizon (Ah).
RE3	Orthic Eutric Brunisol; shallow lithic phase	well	Orthic Dystric Brunisol; shallow lithic phase	well	Less common soil occurs in climatically or edaphically wetter locations and has an extremely to strongly acid upper horizon (Bm). It is equivalent to Racehorse 1 soil association component.
RE4	Orthic Eutric Brunisol; shallow lithic phase	well	Brunisolic Gray Luvisol; shallow lithic phase	well	Less common soil contains a clay enriched subsurface horizon (Bt).
RE5	Orthic Eutric Brunisol; shallow lithic phase	well	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.

* ROCK CLEFT Soil Association - RE (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RE6	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	well	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Rock Cleft soils.
RE7	Orthic Eutric Brunisol; shallow lithic phase	well	Orthic Regosol; shallow lithic phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* ROCK LAKE Soil Association - RJ

Rock Lake soils occur in alpine meadows in the Rocky Mountains, within the Alpine tundra Forest Zone. They have developed in rubbly colluvial veneers usually <50 cm thick derived from a variety of bedrocks (Plate 4.17). Slopes in the rugged mountain summit topography vary from 60 to 100%, while elevations are greater than 2450 m asl. Active nivation, solifluction and cryoturbation are locally evident.

Rock Lake soils are mostly well drained, but locally can vary from rapid to imperfect. They are usually rapidly pervious. The most common texture is gravelly sandy loam, but textures range widely from gravelly silt loam to very gravelly loamy sand. Coarse fragment contents range from 30 to 90% and consist of angular gravels, cobbles and stones. The surface horizon is usually a 10 to 15 cm thick, turfy, organic matter enriched horizon (Ah). Under this is a 10 to 20 cm thick, dark brown, strongly to slightly acid horizon (Bm) which grades to neutral to moderately alkaline parent materials (Ck) at depths between 20 and 40 cm. Bedrock usually occurs at depths of less than 50 cm. The most common soil development is **Orthic Melanic Brunisol; very shallow lithic phase,** but at these high elevations, there is a great diversity of soils.

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
RJ1	Orthic Melanic Brunisol; very shallow lithic phase	well			Consists dominantly of the most common soil as described above.
RJ2	Orthic Melanic Brunisol; very shallow lithic phase	well	Orthic Eutric Brunisol; very shallow lithic phase	well to rapid	Less common soil lacks a well developed, organic matter enriched surface horizon, due to occurrence in climatically or edaphically drier locations or due to relatively recent erosion or deposition.
RJ3	Orthic Melanic Brunisol; very shallow lithic phase	well	Sombric Humo-Ferric podzol; very shallow lithic phase, Sombric Ferro-Humic Podzol; very shallow lithic phase	moderately well to imperfect	Less common soils have organic matter enriched surface horizons (Ah), as well as podzolized subsurface horizons (Bf,Bhf) due to occurrence in climatically or edaphically wetter locations. Subsurface mottling due to seepage, is sometimes evident.
RJ5	Orthic Melanic Brunisol; very shallow lithic phase	well	Orthic Melanic Brunisol; extremely shallow lithic phase	rapid	Less common soil is <20 cm thick over bedrock.

* ROCK LAKE Soil Association - RJ (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
RJ6	Orthic Melanic Brunisol; extremely shallow lithic phase	rapid	Orthic Melanic Brunisol; very shallow lithic phase	well	Most common soil is <20 cm thick over bedrock. Less common soil is as described for Rock Lake soils.
RJ7	Orthic Melanic Brunisol; very shallow lithic phase	well	Orthic Regosol; calcareous, very shallow lithic phase	well	Less common soil lacks soil development due to recent disturbance or deposition and is calcareous to the surface.
RJ8	Orthic Melanic Brunisol; very shallow lithic phase	well	Cumulic Humic Regosol; calcareous, very shallow lithic phase, Orthic Regosol; calcareous, very shallow lithic phase	moderately well	Less common soils occur in avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

RO-YK1
RJ7-RO

Plate 4.17 Krummholz and alpine soils, vicinity of Tangle Peak (see text for explanation of symbols).

ROCKY RIDGE Soil Association - RK

Rocky Ridge soils occupy limited areas in the White River - upper Kootenay River drainages of the Rocky Mountains, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone (Figure 3.5). They have developed in slaty silty colluvial deposits derived from phyllitic bedrock (Plate 3.6). The deposits are usually <1 m thick and occur on 30 to 100% slopes. Elevations range between 1800 and 2300 m asl.

Rocky Ridge soils are well drained and moderately pervious. Textures vary from silt loam (most common) to very gravelly silt loam. Coarse fragment contents can range up to 80% but are mostly <20% and consist of mainly gravel sized, slaty fragments. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a <5 cm thick, discontinuous, light brownish gray (dry), leached horizon (Ae). The Ae overlies a 10 to 30 cm thick, yellowish-brown, extremely to strongly acid, podzolized horizon (Bf) that grades to a light yellowish brown Bm horizon. A weakly developed clay accumulation horizon (Btj) is usually present under the Bm and grades (BC) to relatively unweathered, weakly to medium acid parent materials (C) at about 50 cm. Bedrock is present at depths between 50 and 100 cm. Rocky Ridge soils are transitional to Luvisols, but lacking well developed clay accumulation horizons in the subsurface, have been classified as **Orthic Humo-Ferric Podzol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RK1	Orthic Humo-Ferric Podzol; shallow lithic phase	well			Consists dominantly of the most common soil as described above.
RK2	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Orthic Dystric Brunisol; shallow lithic phase	well	Less common soil has a thinner, less podzolized upper horizon (Bm) due to development in climatically or edaphically drier locations. It is equivalent to the Russette 1 soil association component.
RK3	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Orthic Ferro-Humic Podzol; shallow lithic phase, Sombric Humo-Ferric Podzol; shallow lithic phase	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
RK4	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Podzolic Gray Luvisol; shallow lithic phase	well	Less common soil has a clay enriched subsurface horizon (Bt) due to slightly finer textures.

ROCKY RIDGE Soil Association - RK (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RK5	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid to well	Less common soils are 20 to 50 cm thick over bedrock.
RK6	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid to well	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Rocky Ridge soils.
RK7	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Orthic Regosol; shallow lithic phase	well	Less common soil lacks soil development due to recent disturbance or deposition.
RK8	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Rocky Ridge soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Russette soil association.

ROSEN LAKE Soil Association - RS

Rosen Lake soils occur at lower elevations in the Rocky Mountain Trench and larger valleys in the Rocky Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in blocky and rubbly silty to sandy colluvial materials mostly <1 m thick and derived from non-calcareous bedrocks (Plate 4.18). The steep slopes are usually well in excess of 30%. Elevations range between 1050 and 1350 m asl.

Rosen Lake soils are generally rapidly drained and rapidly pervious. Textures range from gravelly silt loam (most common) to very gravelley sandy loam. Coarse fragment contents range from 30 to 90% and consist of slaty gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface. It overlies a 20 to 40 cm thick, light yellowish brown, very strongly to medium acid horizon (Bm), which grades to relatively unweathered, medium to slightly acid parent material (C) at depths of about 50 cm. Bedrock occurs at depths between 50 and 100 cm. The usual classification is **Orthic Eutric Brunisol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RS1	Orthic Eutric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RS2	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Dark Brown; shallow lithic phase, Orthic Melanic Brunisol; shallow lithic phase	rapid	Less common soils occur in climatically or edaphically drier locations under grassy vegetation and have organic matter enriched surface horizons (Ah).
RS3	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol: shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically wetter locations or on less calcareous parent materials and has a strongly acid yellowish brown, upper horizon (Bm). It is equivalent to the Roche Mountain 1 soil association component.
RS4	Orthic Eutric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase, Orthic Gray Luvisol; shallow lithic phase	rapid to well	Less common soils contain a clay enriched subsurface horizon (Bt) due to somewhat finer textures. On drier sites they may lack upper Bm horizons.

ROSEN LAKE Soil Association - RS (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RS5	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
RS6	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Rosen Lake soils.
RS7	Orthic Euitric Brunisol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.

The Rosen Lake soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Roche Mountain soil association.

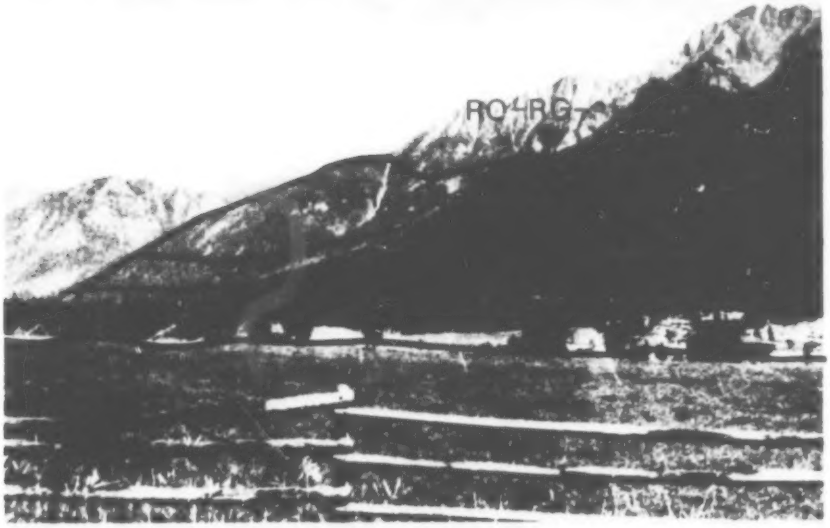

Plate 4.18 Soils in the Rocky Mountain Trench near Norbury Lake (see text for explanation of symbols).

* ROTH CREEK Soil Association - RN

Roth Creek soils occupy limited areas at higher elevations in the Fernie and Flathead basins, within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest zone (Figure 3.3). They have developed in rubbly fine colluvial materials derived from friable, usually non-calcareous shale. The materials are usually <1 m thick and occur on 30 to 100% slopes. Elevations range from 1800 to 2300 m asl.

Rock Creek soils are generally well drained and moderately pervious. Textures vary from gravelly silt loam (most common) to silt loam. Coarse fragment contents are usually less than 50% and consist of mostly gravel sized, shaly fragments. A fibrimor forest floor layer up to 10 cm thick occurs at the soil surface and overlies <5 cm thick, discontinuous leached horizon (Ae). It, in turn, overlies a 15 to 30 cm thick, yellowish-brown, extremely to strongly acid, podzolized horizon (Bf) which grades (Bm, BC) to very dark grayish brown, very strongly to slightly acid parent material at depths of about 50 cm. Bedrock occurs at depths between 50 and 100 cm. The usual classification is **Orthic Humo-Ferric Podzol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RN1	Orthic Humo-Ferric Podzol; shallow lithic phase	well			Consists dominantly of the most common soil as described above.
RN2	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Orthic Dystric Brunisol; shallow lithic phase	well	Less common soil contains a thinner, yellowish-brown upper horizon (Bm) due to occurrence in climatically or edaphically drier locations. It is equivalent to the Racehorse 1 soil soil association component.
RN3	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Orthic Ferro-Humic Podzol; shallow lithic phase, Sombric Humo-Ferric Podzol; shallow lithic phase	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
RN4	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Podzolic Gray Luvisol; shallow lithic phase	well	Less common soil contains a well developed clay accumulation horizon (Bt) in the subsurface.
RN5	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.

* ROTH CREEK Soil Association - RN (Continued)

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RN6	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Roth Creek soils.
RN7	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Orthic Regosol; shallow lithic phase	well	Less common soil lacks soil development due to recent disturbance or deposition.
RN8	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

ROUND PRAIRIE Soil Association - RP

Round Prairie soils occupy limited areas at lower elevations in the Fernie Basin within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone (Figure 3.4). They have developed in rubbly sandy colluvial materials generally <1 m thick and derived from non-calcareous, sandstone, quartzite and conglomerate. Slopes vary from 30% to 100%, while elevations range from 1050 to 1350 m asl.

Round Prairie soils are rapidly drained and rapidly pervious. Textures range between gravelly loam and very gravelly loamy sand with gravelly sandy loam being most common. Coarse fragment contents range from 30 to 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and overlies a 20 to 40 cm thick, light yellowish brown to yellowish-brown (dry) horizon (Bm) that is extremely to strongly acid. This grades (BC) to strongly to medium acid, relatively unweathered parent material (C) at about 50 cm. Bedrock occurs between 50 and 100 cm depth. The usual classification is **Orthic Dystric Brunisol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RP1	Orthic Dystric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RP2	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase, Orthic Melanic Brunisol; shallow lithic phase	rapid	Less common soils occur in climatically or edaphically drier locations, or on less acidic parent materials. They have thinner, less acidic, upper horizons (Bm) and, under grassy vegetation, may have a well developed, organic matter enriched surface horizon (Ah).
RP3	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid to well	Less common soil occurs in climatically or edaphically wetter locations. It has a strong brown, podzolized upper horizon (Bf) and is equivalent to the Bunyon 1 soil association component.
RP5	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
RP6	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Round Prairie soils.

ROUND PRAIRIE Soil Association - RP (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RP7	Orthic Dystric Brunisol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent disturbance or deposition.

The Round Prairie soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Brennan soil association.

ROURKE Soil Association - RF

Rourke soils only occupy limited areas at higher elevations in the Elk and Flathead river drainages, within the lodgepole pine - whitebark pine subzone of the Subalpine Englemann spruce - alpine fir Forest Zone. They have developed in rubbly sandy colluvial materials which are usually <1 m deep and derived from calcareous sandstone or mixed sandstone and limestone (Plate 4.10). Slopes are steep, generally well in excess of 30%. Elevations range from 1800 to 2300 m asl.

Rourke soils are generally rapidly drained and rapidly pervious. Textures range between gravelly loam and very gravelly loamy sand, with gravelly sandy loam being most common. Coarse fragment contents vary between 30 to 90% and consist of angular gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a <5 cm thick, discontinuous, light brownish grey, leached horizon (Ae). The Ae overlies a 10 to 20 cm thick, strong brown (dry), very strongly to medium acid, podzolized horizon (Bf) that grades (Bm) to slightly acid to moderately alkaline parent material (C, Ck) at about 50 cm depth. Bedrock occurs between 50 and 100 cm depth. The usual classification is **Orthic Humo-Ferric Podzol; shallow lithic phase.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RF1	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RF2	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase, Orthic Melanic Brunisol; shallow lithic phase	rapid	The first less common soil has a yellowish-brown, medium to slightly acid upper horizon (Bm) due to occurrence in climatically or edaphically drier locations. It is equivalent to the Ridge Range 1 soil association component. Under grassy vegetation, a well developed surface organic matter enriched (Ah) horizon may be present.
RF3	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Ferro-Humic Podzol; shallow lithic phase, Sombric Humo-Ferric Podzol; shallow lithic phase	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to occurrence in climatically or edaphically wetter locations.
RF4	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Podzolic Gray Luvisol; shallow lithic phase	rapid to well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.

ROURKE Soil Association - RF (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RF5	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
RF6	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Rourke soils.
RF7	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Regosol; calcareous, shallow lithic phase	rapid	Less common soil lacks soil development due to recent erosion or deposition.
RF8	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Cumulic Humic Regosol; calcareous, shallow lithic phase, Orthic Regosol; calcareous, shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface or subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

The Rourke soil association was not described in detail or sampled. A soil with similar morphology that was described, sampled and analyzed is the Ridge Range soil association.

* RUAULT Soil Association - RT

Ruault soils occur at the rugged, upper elevations of the Rocky Mountains and portions of the Purcell Mountains (Figure 3.2), within the lodgepole pine - whitebark pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in rubbly colluvial deposits usually <1 m deep and derived from calcareous bedrocks (Plates 3.3, 3.6, 4.2, 4.5). The mountain summit topography has slopes between 30 and 100%. Elevations range between 1800 and 2300 m asl.

Ruault soils are generally rapidly drained and rapidly pervious. Textures are variable and range from gravelly silt loam (most common) to very gravelly loamy sand. Coarse fragment contents vary between 30 and 80% and consist of angular gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick normally occurs at the soil surface and overlies a thin, intermittant grayish, leached horizon (Ae). They overlie a 10 to 20 cm thick, strong brown, medium to strongly acid, podzolized horizon (Bf), which rapidly grades (Bm, Bmk, BCk) to moderately or mildly alkaline, carbonate enriched parent material (Cca, Ck) at about 30 to 40 cm. The parent material is characterized by white carbonate coatings on the undersides of coarse fragments. Bedrock is usually present at 50 to 100 cm depth. The usual classification is **Orthic Humo-Ferric Podzol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RT1	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RT2	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Less common soil occurs in climatically or edaphically drier locations. It has a thin, light yellowish brown, medium to slightly acid surface horizon (Bm) and is equivalent to the Big Fish 1 soil association component.
RT3	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Ferro-Humic Podzol; shallow lithic phase, Sombric Humo-Ferric Podzol; shallow lithic phase	moderately well	Less common soils occur in climatically or edaphically wetter locations. They have organic matter enriched upper horizons (Bhf, Ah).
RT4	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Podzolic Gray Luvisol; shallow lithic phase	rapid to well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.

* RUAULT Soil Association - RT (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RT5	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
RT6	Orthic Humo-Ferric Podzol; very shallow lithic phase	rapid	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Ruault soils.
RT7	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Orthic Regosol; calcareous, shallow lithic phase	rapid	Less common soil lacks soil development due to recent erosion or deposition.
RT8	Orthic Humo-Ferric Podzol; shallow lithic phase	rapid	Cumulic Humic Regosol; calcareous, shallow lithic phase, Orthic Regosol; calcareous, shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* RUSSETTE Soil Association - RU

Russette soils occupy limited areas in the White and upper Kootenay river drainages of the Rocky Mountains, within the Rocky Mountain Douglas fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in slaty silty colluvium usually <1 m deep and derived from phyllitic bedrocks (Plates 3.6, 4.2, 4.6, 4.11). Slopes range from 30 to 100% and elevations vary between 1350 and 1800 m asl.

Russette soils are mostly well drained and moderately pervious. Textures range from silt loam (most common) to very gravelly silt loam. Coarse fragment contents are usually less than 30% but locally may increase to 80% and consist of slaty, mostly gravel sized fragments. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface and overlies a <5 cm thick, discontinuous, light brownish gray (dry), leached horizon (Ae). The Ae overlies a 10 to 30 cm thick, light yellowish brown, very strongly to strongly acid horizon (Bm). A weakly developed clay accumulation horizon (Btj) is often present under the Bm and grades (BC) to relatively unweathered, weakly to medium acid parent material (C) at about 50 cm depth. Bedrock is encountered at depths between 50 and 100 cm. Russette soils are transitional to Luvisols, but lacking well developed clay accumulation horizons in the subsurface, are classified as **Orthic Dystric Brunisol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RU1	Orthic Dystric Brunisol; shallow lithic phase	well			Consists dominantly of the most common soil as described above.
RU2	Orthic Dystric Brunisol; shallow lithic phase	well	Orthic Eutric Brunisol; shallow lithic phase	well	Less common soil has a shallower, medium to slightly acid to upper horizon (Bm) due to occurrence in climatically or edaphically drier locations or on less acidic parent materials. It is equivalent to the River Run 1 soil association component.
RU3	Orthic Dystric Brunisol; shallow lithic phase	well	Orthic Humo-Ferric Podzol; shallow lithic phase	well	Less common soil has a podzoled upper horizon (Bf) due to occurrence in climatically or edaphically wetter locations. It is equivalent to the Rocky Ridge 1 soil association component.
RU4	Orthic Dystric Brunisol; shallow lithic phase	well	Brunisolic Gray Luvisol; shallow lithic phase	well	Less common soil contains a clay enriched subsurface horizon (Bt) due to slightly finer textures.

* RUSSETTE Soil Association - RU (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RU5	Orthic Dystric Brunisol; shallow lithic phase	well	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
RU6	Orthic Dystric Brunisol; very shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase	well	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Russette soils.
RU7	Orthic Dystric Brunisol; shallow lithic phase	well	Orthic Regosol; shallow lithic phase	well	Less common soil lacks soil development due to recent disturbance or deposition.
RU8	Orthic Dystric Brunisol; shallow lithic phase	well	Cumulic Humic Regosol; shallow lithic phase, Orthic Regosol; shallow lithic phase	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed, due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* RYANIER Soil Association - RY

Ryanier soils occur in the drier portions of the Purcell Mountains, within the lodgepole pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in rubbly colluvial materials derived from fine to medium grained, non-calcareous bedrocks. The materials are usually < 1m deep and occur on 30 to 100% slopes. Elevations range from 1050 to 1350 m asl.

Ryanier soils are mainly rapidly drained and rapidly pervious. Textures vary from gravelly silt loam (most common) to very gravelly sandy loam. Coarse fragment contents range between 30 and 80% and consist mainly of angular gravels with some cobbles and stones. A fibrimor forest floor layer up to 5 cm thick usually occurs at the soil surface. Under this is a 10 to 30 cm thick, yellowish-brown, medium to slightly acid horizon (Bm) which grades (BC) to relatively unweathered, slightly acid to neutral parent material (C, Ck) at about 50 cm depth. Bedrock occurs at depths between 50 and 100 cm. The usual classification is **Orthic Eutric Brunisol; shallow lithic phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
RY1	Orthic Eutric Brunisol; shallow lithic phase	rapid			Consists dominantly of the most common soil as described above.
RY2	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Melanic Brunisol; shallow lithic phase	rapid	Less common soil occurs in climaticallly or edaphically drier locations, and is characterized by a well developed, dark coloured, organic matter enriched surface horizon (Ah) developed under dominantly grassy vegetation.
RY3	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Dystric Brunisol; shallow lithic phase, Orthic Humo-Ferric Podzol; shallow lithic phase	well	Less common soils occur in climatically or edaphically wetter locations, or on more acidic parent materials. They have deeper, yellowish-brown (dry), extremely to strongly acid upper horizons (Bm, Bf) and are respectively equivalent to Bohan Creek 1 and Bonner 1 soil association components.
RY4	Orthic Eutric Brunisol; shallow lithic phase	rapid	Brunisolic Gray Luvisol; shallow lithic phase, Orthic Gray Luvisol; shallow lithic phase	rapid	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. In drier locations they may lack an upper Bm horizon.

* RYANIER Soil Association - RY (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
RY5	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Less common soil is 20 to 50 cm thick over bedrock.
RY6	Orthic Eutric Brunisol; very shallow lithic phase	rapid	Orthic Eutric Brunisol; shallow lithic phase	rapid	Most common soil is 20 to 50 cm thick over bedrock. Less common soil is as described for Ryanier soils.
RY7	Orthic Eutric Brunisol; shallow lithic phase	rapid	Orthic Regosol; shallow lithic phase	rapid	Less common soil lacks soil development due to recent deposition or erosion.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* SAHA Soil Association - SA

Saha soils occur in the drier portions of the Rocky Mountain Trench, under grassland or cultivated vegetative cover within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty sandy fluvial or aeolian veneers overlying gravelly fluvioglacial outwash plains, terraces and fans derived from areas of predominantly limestone and dolomite (Plates 3.1, 3.2, 4.16, 4.18). Slopes are usually gentle but locally range up to 30%. Elevations lie between 700 and 1050 m asl.

Saha soils are well drained and moderately pervious. Textures vary from silt loam to fine sandy loam (most common) in the upper soil and range from very gravelly silt loam to very gravelly loamy sand in the subsoil. Coarse fragment contents of the subsoil are high, usually between 50 and 90% and consist of rounded gravels and cobbles. Contents in the upper soil are low. A very dark brown, organic matter enriched surface horizon (Ah) extends to depths of 10 to 20 cm (or deeper if cultivated). It is underlain by a 10 to 30 cm thick, yellowish-brown, slightly acid to mildly alkaline solum (Bm, Bmk, BCk). Carbonate enriched and cemented, mildly to moderately alkaline subsoil horizons (IICk, IICca) characterized by white carbonate coatings on the undersides of coarse fragments extend from the base of the solum to depths that may exceed 1 m. The usual classification is **Orthic Dark Brown.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
SA1	Orthic Dark Brown	well			Consists dominantly of the most common soil as described above.
SA3	Orthic Dark Brown	well	Orthic Eutric Brunisol, Orthic Melanic Brunisol	well	Less common soils have less well developed organic matter enriched surface soil horizons, but otherwise resemble the most common soil. Those in which the organic matter enriched surface is <10 cm thick are equivalent to the Elko 1 soil association component.
SA9	Orthic Dark Brown	well	Orthic Eutric Brunisol; calcareous phase	well	Less common soil lacks a well developed organic matter enriched surface and is alkaline to the surface.
SA10	Orthic Dark Brown	well	Calcareous Dark Brown	well	Less common soil is mildly to moderately alkaline to the surface, but otherwise resembles the most common soil.

* SAHA Soil Association - SA (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
SA11	Orthic Dark Brown	well	Orthic Dark Brown; saline phase, Dark Brown Solonetz	well to moderately well	Less common soils are saline and some contain organic matter stained, hard, columnar peds (Bnt).

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* SALISHAN Soil Association - S

Salishan soils occur on the floor of the Rocky Mountain Trench, within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir Forest Zone. They have developed in silty clay to silty sand floodplain deposits derived from areas of limestone, dolomite and phyllite (Plate 3.2). Slopes are usually <2%, while elevations range from 700 to 900 m asl.

Salishan soils are mostly imperfectly to poorly drained and slowly to moderately pervious. Textures range from silty clay loam to fine sandy loam, with silt loam being most common. Coarse fragments are not usually present. The dominant soil colour is light brownish gray and dark yellowish brown mottles are usually present. Thin layers and lenses of varying textures, often organic matter enriched, are common in the subsoil.

Most Salishan soils have insignificant soil development due to periodic flooding and surface additions of new material. Water tables are near the soil surface for significant periods of the year. A rhizomull layer up to 4 cm thick, consisting of plant litter and a thin, mildly alkaline, organic matter enriched surface horizon (Ahk) are commonly present at the soil surface. Subsurface and subzoil horizons are weakly gleyed and mildly alkaline (Cgjk). The usual classification is **Gleyed Cumulic Regosol; calcareous phase.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
S1	Gleyed Cumulic Regosol; calcareous phase	imperfect			Consists dominantly of the most common soil as described above.
S2	Gleyed Cumulic Regosol; calcareous phase	imperfect	Cumulic Regosol; calcareous phase	moderately well	Less common soil occupies higher lying, better drained areas, or has slightly coarser textures and drains more readily than the most common soil.
S3	Gleyed Cumulic Regosol; calcareous phase	imperfect	Rego Gleysol; calcareous phase	poor	Less common soil is strongly gleyed (Cgk).
S10	Gleyed Cumulic Regosol; calcareous phase	imperfect	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Less common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surfaces (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape.

* SALISHAN Soil Association - S (Continued)

Soil Assoc. Component	Most Common Soil		Less Common Soil		Comments
	Classification	Drainage	Classification	Drainage	
S11	Rego Gleysol; calcareous phase, Terric Mesisol	very poor to poor	Gleyed Cumulic Regosol; calcareous phase	imperfect	Most common soils have strongly gleyed mineral horizons (Cgk) and may also have organic surfaces (Om) up to 160 cm thick. They occupy the lowest, wettest positions in the floodplain landscape. The less common soil is as described for Salishan soils.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* SANDON Soil Association - SN

Sandon soils occupy limited areas at higher elevations in the Purcell Mountains, within the forested subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly silty morainal (till) deposits which are mostly >1 m thick and derived from medium grained, non-calcareous bedrocks (Plate 3.7). Topography is typical of high elevation valleys and mountain summits with slopes ranging from 30 to 100%. Elevations vary between 1500 and 2300 m asl.

Sandon soils are generally moderately well drained and moderately pervious. Texture is usually silt loam or gravelly silt loam while coarse fragment contents range between 20 and 60% and consist of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface. It overlies a <5 cm thick, discontinuous, greyish, leached horizon (Ae) which, in turn, overlies a 20 to 40 cm thick, yellowish-brown (dry), extremely to very strongly acid, podzolized horizon (Bf). This horizon grades (Bm, BC) to relatively unweathered, moderately to slightly acid parent material (C) at about 60 cm depth. The usual classification is **Orthic Humo-Ferric Podzol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
SN1	Orthic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
SN2	Orthic Humo-Ferric Podzol	moderately well	Orthic Dystric Brunisol	moderately well to well	Less common soil occurs in climatically or edaphically drier locations and its' upper horizon is brunisolic (Bm).
SN3	Orthic Humo-Ferric Podzol	moderately well	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to development in climatically or edaphically wetter locations.
SN4	Orthic Humo-Ferric Podzol	moderately well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	moderately well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. The second listed is equivalent to the Shields 1 soil association component.
SN5	Orthic Humo-Ferric Podzol	moderately well	Orthic Humo-Ferric Podzol; shallow lithic phase	moderately well to well	Less common soil is 50 to 100 cm thick over bedrock.
SN7	Orthic Humo-Ferric Podzol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.

* SANDON Soil Association - SN (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
SN8	Orthic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* SENTINEL Soil Association - SL

Sentinel soils occupy limited areas in the Purcell Mountains, within the lodgepole pine - Engelmann spruce - alpine fir subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in gravelly sandy morainal (till) deposits that are mostly >1 m thick and derived from medium to coarse grained, non-calcareous bedrocks. They occur on valley floors, valley walls and in rugged mountain summit topography. Slopes are variable, ranging from 10 to 60%, while elevations range between 1350 and 1650 m asl.

Sentinel soils are generally well to rapidly drained and rapidly to moderately pervious. Textures range from gravelly sandy loam (most common) to very gravelly loamy sand. Coarse fragment contents vary between 20 and 60% and consist mostly of subangular and subrounded gravels with some cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a <5 cm thick, discontinuous, light brownish gray (moist), leached horizon (Ae). It, in turn, overlies a 20 to 30 cm thick, yellowish-brown (dry), very strongly to strongly acid horizon (Bm), that grades (BC) to relatively unweathered, extremely to very strongly acid parent materials (C) at about 40 cm depth. The usual classification is **Orthic Dystric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
SL1	Orthic Dystric Brunisol	well			Consists dominantly of the most common soil as described above.
SL2	Orthic Dystric Brunisol	well	Orthic Eutric Brunisol	well to rapid	Less common soil has a thinner, medium to slightly acid upper horizon (Bm), and occurs in climatically or edaphically drier locations, or on less acidic parent materials.
SL3	Orthic Dystric Brunisol	well	Orthic Humo-Ferric Podzol	well	Less common soil has a yellowish-brown (dry), strongly to extremely acid, podzolized upper horizon (Bf) due to occurrence in climatically or edaphically wetter locations.
SL4	Orthic Dystric Brunisol	well	Brunisolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer textures. In wetter, cooler locations they have podzolic upper horizons (Bf) and are equivalent to the Shields 1 soil association component.

* SENTINEL Soil Association - SL (Continued)

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
SL5	Orthic Dystric Brunisol	well	Orthic Dystric Brunisol; shallow lithic phase	rapid to well	Less common soil is 50 to 100 cm thick over bedrock.
SL7	Orthic Dystric Brunisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.
SL8	Orthic Dystric Brunisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface or subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* SHIELDS Soil Association - SS

Shields soils occupy limited areas in the Purcell Mountains, within the lodgepole pine - Engelmann spruce - alpine fir subzone of the Interior western hemlock - western red cedar Forest Zone (Figure 3.6). They have developed in gravelly silty morainal (till) deposits derived from fine to medium grained, non-calcareous bedrocks. The till is usually >1 m thick and occurs on valley floors and valley sides. Slopes vary between 10 and 60%, while elevations range between 1350 and 1650 m asl.

Shields soils are mostly moderately well drained and moderately to slowly pervious. Textures range between gravelly silty clay loam and very gravelly silt loam, with gravelly silt loam being the most common. Coarse fragment content varies from 20 to 60% and consists of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 10 cm thick usually occurs at the soil surface and overlies a sometimes discontinuous, grayish, leached horizon (Ae), usually <5 cm thick. It is underlain by a 10 to 20 cm thick, yellowish-brown (dry), very strongly acid horizon (Bf) that grades to 30 to 45 cm of light yellowish-brown, less strongly weathered material (Bm). It, in turn, is underlain at depths below 50 cm by a 10 to 20 cm thick, strong, angular blocky, clay accumulation horizon (Bt), that overlies relatively unweathered parent material (C) at about 70 cm depth. The usual classification is **Luvisolic Humo-Ferric Podzol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
SS1	Luvisolic Humo-Ferric Podzol	moderately well			Consists dominantly of the most common soil as described above.
SS2	Luvisolic Humo-Ferric Podzol	moderately well	Brunisolic Gray Luvisol	moderately well to well	Less common soil occurs in climatically or edaphically drier locations. It has a yellowish-brown, weakly podzo-upper horizon (Bm) and is equivalent to the Skelly 1 soil association component.
SS3	Luvisolic Humo-Ferric Podzol	moderately well	Luvisolic Ferro-Humic Podzol	moderately well	Less common soil occurs in climatically or edaphically wetter locations, and has an organic matter enriched upper horizon (Bhf).
SS4	Luvisolic Humo-Ferric Podzol	moderately well	Orthic Humo-Ferric Podzol	moderately well	Less common soil lacks a clay accumulation horizon due to slightly coarser textures. It is equivalent to the Sandon 1 soil association component.
SS5	Luvisolic Humo-Ferric Podzol	moderately well	Luvisolic Humo-Ferric Podzol; shallow lithic phase	moderately well to well	Less common soil is 50 to 100 cm thick over bedrock.

* SHIELDS Soil Association - SS (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
SS7	Luvisolic Humo-Ferric Podzol	moderately well	Orthic Regosol	moderately well	Less common soil lacks soil development due to recent disturbance or deposition.
SS8	Luvisolic Humo-Ferric Podzol	moderately well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may contain organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* SKELLY Soil Association - SY

Skelly soils occur in limited areas in the Purcell Mountains, within the Rocky Mountain Douglas-fir - lodgepole pine - western larch subzone of the Interior western hemlock - western red cedar Forest Zone. They have developed in silty to gravelly silty morainal (till) deposits derived from medium grained, non-calcareous bedrocks (Plate 3.7). The till is usually >1 m thick and most commonly occurs on valley floors and sides. Slopes vary between 10 and 60%, while elevations range between 1200 and 1350 m asl.

Skelly soils are mostly well drained and moderately to slowly pervious. Texture is usually silt loam, although gravelly silt loam or very gravelly silt loam are also common. Coarse fragment content varies between 20 and 60% and consists of mostly subangular and subrounded gravels, with lesser cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface and overlies a <5 cm thick, discontinuous, grayish, leached horizon (Ae1). It, in turn, overlies a 5 to 15 cm thick, yellowish-brown (dry), extremely to strongly acid horizon (Bm). It is underlain by another leached horizon (Ae2), 15 to 30 cm thick that overlies a 20 to 40 cm thick, strong, angular blocky, clay accumulation horizon (Bt). The Bt overlies relatively unweathered, medium acid parent materials (C) at about 70 cm depth. The usual classification is **Brunisolic Gray Luvisol.**

Soil Assoc. Component	Most Common Soil		Less Common Soil		
	Classification	Drainage	Classification	Drainage	Comments
SY1	Brunisolic Gray Luvisol	well			Consists dominantly of the most common soil as described above.
SY2	Brunisolic Gray Luvisol	well	Orthic Gray Luvisol	well	Less common soil lacks a brunisolic, upper (Bm) horizon and occurs in climatically or edaphically drier locations.
SY3	Brunisolic Gray Luvisol	well	Podzolic Gray Luvisol, Luvisolic Humo-Ferric Podzol	well to moderately well	Less common soils occur in climatically or edaphically wetter locations, and have a podzolized upper horizon (Bf). The second listed is equivalent to the Shields 1 soil association component.
SY4	Brunisolic Gray Luvisol	well	Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol	well to moderately well	Less common soils lack a clay accumulation horizon due to slightly coarser textures. In wetter, cooler locations they have a podzolized (Bf) upper horizon.
SY5	Brunisolic Gray Luvisol	well	Brunisolic Gray Luvisol; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.

* SKELLY Soil Association - SY (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
SY7	Brunisolic Gray Luvisol	well	Orthic Regosol	well	Less common soil lacks soil development due to recent disturbance or deposition.
SY8	Brunisolic Gray Luvisol	well	Cumulic Humic Regosol, Orthic Regosol	moderately well	Less common soils occur on avalanche tracks and run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.
SY9	Brunisolic Gray Luvisol	well	Orthic Eutric Brunisol	well	Less common soil has developed on localized, calcareous parent materials. It has a relatively thin, pale brown, slightly acid surface horizon (Bm) that grades (BCk) to mildly or moderately alkaline parent material (Ck). It is equivalent to the _Wycliffe 1_ soil association component.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

* SPILLIMACHEEN Soil Association - SP

Spillimacheen soils occur in both the Rocky and Purcell mountains, within the Rocky Mountain Douglas-fir - lodgepole pine subzone of the Subalpine Engelmann spruce - alpine fir Forest Zone. They have developed in gravelly silty morainal (till) materials usually >1 m in depth and derived from a variety of calcareous bedrocks (Plate 4.19). The tills most commonly occur on valley floors and lower valley sides. Slopes are generally in excess of 30%, while elevations range from between 1350 and 1800 m asl.

Spillimacheen soils are generally well drained and moderately pervious. Textures range between gravelly silt loam (most common) and very gravelly sandy loam. Coarse fragment contents vary between 30 and 60% and consist mainly of subangular and subrounded gravels with lesser cobbles and stones. A fibrimor forest floor layer up to 6 cm thick usually occurs at the soil surface and overlies a <5 cm thick, discontinuous, grayish, leached horizon (Ae). It, in turn, overlies a 5 to 15 cm thick, light yellowish brown, slightly acid horizon (Bm). The Bm grades (Bmk) to mildly or moderately alkaline, carbonate enriched, compact parent material (Cca, Ck) at about 25 cm depth. The parent material is characterized by accumulations of white carbonates on the undersides of coarse fragments. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
SP1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
SP2	Orthic Eutric Brunisol	well	Orthic Melanic Brunsiol	rapid to well	Less common soil has a well developed, organic matter enriched surface horizon (Ah) due to occurrence in climatically or edaphically drier locations dominated by grassy vegetation.
SP3	Orthic Eutric Brunisol	well	Orthic Dystric Brunsiol; Orthic Humo-Ferric Podzol	well	Less common soils have thicker, yellowish brown, extremely to strongly acid upper horizons (Bm, Bf) due to occurrence in climatically or edaphically wetter locations, or on less basic parent material. The second listed is equivalent to the Marconi 1 soil association component.
SP4	Orthic Eutric Brunisol	well	Brunisolic Gray Luvisol, Podzolic Gray Luvisol	well	Less common soils contain a clay enriched subsurface horizon (Bt) due to slightly finer soil textures. They are respectively equivalent to the Mount Mike 1 and McKay Mountain 1 soil association components.

* SPILLIMACHEEN Soil Association - SP (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
SP5	Orthic Eutric Brunisol	well	Orthic Eutric Brunisol; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.
SP7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.
SP8	Orthic Eutric Brunisol	well	Cumulic Humic Regosol; calcareous phase, Orthic Regosol; calcareous phase	moderately well	Less common soils occur on avalanche tracks or run-out zones. They may have organic matter enriched surface and subsurface horizons, but otherwise are weakly developed due to recent erosion or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

Plate 4.19 Soils in the Lussier River valley (see text for explanation of symbols).

* WYCLIFFE Soil Association - WY

Wycliffe soils occur in the Rocky Mountain Trench and in a few adjacent valleys in the Rocky and Purcell mountains, within the ponderosa pine subzone of the Interior Rocky Mountain Douglas-fir - Forest Zone (Figure 3.1). They have developed in gravelly silty morainal (till) materials derived from calcareous bedrocks (Plates 3.1, 3.2). The till deposits are usually >1 m deep and occur on valley floors and lower valley sides. Slopes vary between 10 and 60% while elevations range between 700 and 1050 m asl.

Wycliffe soils are generally well drained and moderately pervious. Textures range from gravelly silt loam (most common) to very gravelly loam. Coarse fragment contents vary between 20 and 60% and consist of subangular and subrounded gravels, cobbles and stones. A fibrimor forest floor layer up to 4 cm thick usually occurs at the soil surface. It overlies a 5 to 15 cm thick, pale brown (dry), slightly acid horizon (Bm), which grades (Bmk) to moderately alkaline, carbonate enriched parent material (Cca, Ck) at about 30 cm depth. The parent material is characterized by white carbonate coatings on the undersides of coarse fragments. The usual classification is **Orthic Eutric Brunisol.**

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
WY1	Orthic Eutric Brunisol	well			Consists dominantly of the most common soil as described above.
WY2	Orthic Eutric Brunisol	well	Orthic Dark Brown, Orthic Melanic Brunisol	well	Less common soils have a well developed, organic matter enriched surface horizon (Ah), due to their occurrence in climatically or edaphically drier locations dominanted by grassy vegetation. The first is equivalent to the Plumbob 1 soil association component.
WY4	Orthic Eutric Brunisol	well	Orthic Gray Luvisol, Brunisolic Gray Luvisol	well	Less common soils contain a clay accumulation horizon (Bt) due to slightly finer textures. On drier sites they may lack brunisolic upper horizons (Bm). They are respectively equivalent to the Kinbasket 1 and Flatbow 1 soil association components.
WY5	Orthic Eutric Brunisol	well	Orthic Eutric Brunisol; shallow lithic phase	well to rapid	Less common soil is 50 to 100 cm thick over bedrock.

* WYCLIFFE Soil Association - WY (Continued)

Soil Assoc. Component	Most Common Soil Classification	Most Common Soil Drainage	Less Common Soil Classification	Less Common Soil Drainage	Comments
WY7	Orthic Eutric Brunisol	well	Orthic Regosol; calcareous phase	well	Less common soil lacks soil development due to recent disturbance or deposition.

* A detailed soil profile description, together with physical and chemical analyses, is available in the B.C. Soil Information System.

YAHK CREEK Soil Association - YK

Yahk Creek soils occur on, and at the base of steep mountain slopes throughout the Rocky and Purcell Mountains in all forest zones. They have developed in unstable blocky and rubbly talus deposits most commonly derived from calcareous bedrock (Plates 3.3, 4.2, 4.7). The talus is generally deep and forms segments of cones or aprons with 60 to 100% slopes. Elevations mostly range between 1800 and 2300 m asl. Most Yahk soil areas are either unvegetated, or only sparsely vegetated.

Yahk Creek soils are usually rapidly drained and rapidly pervious. Textures range between very gravelly silt loam and very gravelly sandy loam (most common). Coarse fragment contents vary from 70 to 90% and consist of angular gravels, cobbles, stones and boulders. The solum is mostly undeveloped and the usual classification is **Cumulic Regosol,** although Orthic Regosols are also common.

Soil Assoc.	Most Common Soil		Less Common Soil		
Component	Classification	Drainage	Classification	Drainage	Comments
YK1	Cumulic Regosol	rapid			Consists dominantly of the most common soil as described above.
YK9	Cumulic Regosol	rapid	Orthic Eutric Brunisol, Orthic Dystric Brunisol	rapid	Less common soils have weakly developed upper horizons (Bm) and occur on stabilized areas of talus.
YK10	Cumulic Regosol	rapid	Orthic Humo-Ferric Podzol	well	Less common soil has a podzolized upper horizon (Bf) and occurs on stabilized areas of talus.
YK11	Cumulic Regosol	rapid	Orthic Ferro-Humic Podzol, Sombric Humo-Ferric Podzol	well to moderately well	Less common soils have organic matter enriched upper horizons (Bhf, Ah) due to occurrence in wetter, stabilized areas of talus.

The Yahk Creek soil association was not described in detail or sampled.

YMIR Soil Association - YR

Ymir soils occur on, and at the base of steep mountain slopes in the Purcell Mountains in all forest zones. They have developed in unstable, blocky, and rubbly talus deposits derived from non-calcareous bedrocks. The talus is generally deep and forms segments of cones or aprons with 60 to 100% slopes. Elevations usually range between 1500 and 2300 m asl. Most Ymir soil areas are either unvegetated or only sparsely vegetated.

Ymir soils are rapidly drained and rapidly pervious. Textures range between very gravelly silt loam and very gravelly sandy loam (most common). Coarse fragment content is 70 to 90% and consists of angular gravels, cobbles, stones and boulders. The solum is generally undeveloped and the usual classification is **Cumulic Regosol,** although Orthic Regosols are also common.

Soil Assoc. Component	Most Common Soil Classification	Drainage	Less Common Soil Classification	Drainage	Comments
YR1	Cumulic Regosol	rapid			Consists dominantly of the most common soil as described above.
YR9	Cumulic Regosol	rapid	Orthic Humo-Ferric Podzol	rapid to well	Less common soil has a podzolized upper horizon (Bf) and occurs on stabilized areas of talus.

The Ymir soil association was not described in detail or sampled.

4.3 MISCELLANEOUS LAND TYPES

ANTHROPOGENIC - A

Anthropogenic Land Type consists of severely man-modified materials such as mine tailings, open-pit mines, overburden dumps, gravel pits, etc.

ICE - I

The Ice Land Type consists of glaciers and permanent snow fields.

ROCK OUTCROP - RO

The Rock Outcrop Land Type is composed of consolidated bedrock exposed at, or occurring within 10 cm of the land surface.

CHAPTER FIVE

METHODOLOGY AND INTERPRETATIONS FOR SPECIFIC LAND USES

5.1 INTRODUCTION

Soil associations identified and described for the East Kootenays have been interpreted for a variety of land uses. Interpretations for forestry, agriculture, recreation, wildlife and residential settlement are presented. Methodologies for deriving the interpretations are summarized; fuller explanations are contained in the annoted references.

Soil interpretations supply resource information to aid in land use planning and management. The interpretations provide a relative prediction of soil behaviour, or performance under specific uses. Those presented in this report are intended to serve as inputs into the planning process and not as recommendations for site specific land use.

The reliability of soil interpretations depends both the reliability of the base data and on the interpretive methodology used. The methodologies applied in this report are based either on the Canada Land Inventory System or on procedures developed by the Surveys and Resource Analysis Branch, British Columbia Ministry of Environment.

The reliability of soil interpretations also depends upon the homogeniety of the soils within a soil map delineation. Some map delineations are much more complex than others. In addition, delineations with good access have generally been more intensively field inspected, consequently, interpretative classifications applied to these delineations will likely be more accurate than for those not field checked. Figure 2.1 depicts the level of access into different portions of the project area. Map delineations may also contain localized inclusions which are too small to identify at the scale of mapping; these may be substantially different from the soils indicated by the map symbol.

Soil associations that are rated as having severe limitations, or very low capability for a particular use should generally be considered as unsuitable for that use. However, it does not imply that the soil or landscape cannot be modified to remove, or correct, the limitations, assuming sufficient technical and financial inputs.

5.2. TERRAIN CAPABILITY FOR RESIDENTIAL SETTLEMENTS

Certain areas of the East Kootenays have, or are experiencing rapid growth and as a result, settlement suitability studies have been conducted for townsite expansion at Invermere/Windermere, Cranbrook, Fernie, Elkford, Sparwood and a proposed townsite location at Forsyth Creek (Howell Jones, 1981, 1980, and Resource Analysis Branch, 1977, 1977a, 1977b, 1977c, respectively). Individuals interested in these areas should refer to these reports and folios since they were mapped at a 1:20 000 scale, and are based upon considerably more intensive field investigations and analysis than are the Terrain Capability for Residential Settlement ratings provided in Table 5.1 of this report.

This section summarizes the methodology for rating the capability for residential settlement of the soil associations described in Chapter Four. The methodology is according to the Resource Analysis Branch's manual "Terrain Capability for Residential Settlements" (Maynard, 1979). "Terrain" as utilized in the title of the manual, implies the use of both pedological (soils) and geological information and data.

Residential land uses considered in the ratings include foundation support for dwellings and roads, septic tank absorption fields, shallow excavations for basements and underground utilities, sand

and gravel sources, landfill sites and sources of topsoil. These specific uses generally affect, or are affected by, conditions of the ground within the upper three meters. It includes the solum (soil), the unweathered surficial material underlying the solum (soil parent material), and where the surficial material is relatively shallow, the bedrock. In the project area, samples to determine soil engineering characteristics were generally collected one to three meters below the soil surface in the unweathered soil parent materials. Analysis were performed to define the Unified soil texture, plastic limits and liquid limits. These data and information recorded in the description of soil physical properties, such as slope, depth to impermeable layers, bedrock and water table, percentage of coarse fragments, soil drainage class, stoniness, soil texture and perviousness, and presence of seepage, were utilized in rating the Terrain Capability for Residential Settlement (Table 5.1).

Physical requirements and limitations for the various residential development uses are described in Maynard, 1979. The interpretive rating involves assessment of the total number of potentially troublesome or unacceptable conditions limiting development, and applying a subjective constraint class. This latter value (slight, moderate or severe) is then recorded for the Terrain Capability for Residential Settlement interpretations in Table 5.1. Slight constraints present only minor limitations, whereas severe constraints seriously limit conventional residential development.

5.2.1 Conditions for Septic Tank Absorption Fields

A septic tank field is an absorption system for sewage effluent disposal. It consists of subsurface tiles or perforated pipes (usually about 0.6 m below the ground surface) that distribute effluent from a septic tank uniformly into soil and underlying surficial materials. The absorption capacity of the soil is governed by properties which influence the rate at which effluent moves through the seepage field. The effluent must be absorbed and filtered by the soil materials, otherwise untreated material may reach the surface or contaminate groundwater. Criteria evaluated include: soil drainage, depth to water table, depth to impermeable layer or bedrock, presence of surface runoff, slope, soil texture and permeability and presence/absence of permafrost and periglacial processes.

5.2.2 Foundation Conditions for Low Rise Buildings

Only single family dwellings or other structures with similar foundation requirements are considered in this rating. Buildings with more than three storeys and other buildings with foundation loads in excess of that of a three-storey dwelling are not included. The emphasis in assessing foundation conditions is on the properties which affect bearing capacity and compressibility, potential volume change and frost action, and the hydrologic conditions affecting drainage. Slope and depth to bedrock which affect the ease of excavating basements are also considered in Section 5.2.4.

5.2.3 Subgrade For Local Roads and Streets

Subgrade refers to surficial materials over which roads and streets, consisting of paved surfaces on gravel bases, are built. Conventional provisions for drainage are assumed. An evaluation of soil characteristics for these uses assumes that the roads are built mainly from material at hand and that cuts and fills are usually limited to depths of less than 2 metres. Main highways are excluded from the evaluation. Soil properties that affect design and construction are those which affect the load supporting capacity and stability of the subgrade (texture, shrink-swell and frost action potential, soil drainage and permeability), and those which affect the workability and amount of cut and fill needed (slope, depth to bedrock, texture, and hydrologic conditions).

5.2.4 Ease of Excavating Materials to a Shallow Depth

Ease of excavation pertains to the ability to remove materials through excavating or trenching to a depth of 2 to 3 meters using light machinery. Shallow excavations are necessary for basements of residential dwellings, for cemeteries, and for underground utilities such as storm sewers and water mains. Most surficial materials can be fairly easily removed with light equipment such as a backhoe. Hard bedrock generally requires blasting. Factors which hinder excavation include high water tables, bedrock, adverse topography, large boulders, and materials with poor workability and low sidewall stability.

5.2.5 Potential Sand and Gravel Sources

Determining good sand and gravel sources depends on the specific uses for the aggregate. Because these vary from construction cement, where gravel is subject to strict specifications, to local road fill, where most gravel is acceptable, it is difficult to evaluate aggregate deposits on the basis of general characteristics. Users must ultimately by responsible for evaluating the potential of the deposit within their own requirements. The main purpose of these ratings is to guide report users to local sources. Criteria used in determining potential source areas for sand or gravel include soil texture and drainage, depth to water table or bedrock, depth of unsuitable overburden, and flood hazard.

5.2.6 Capability for Solid Waste Disposal (Landfill)

Assessing terrain capability for solid waste disposal should be based on those conditions which affect the possibility of pollution occurring from a potential landfill site. Some of the important aspects include groundwater conditions, permeability and absorption capacity of the surficial and soil materials, bedrock conditions, and distance to the nearest point of water use. Not all of these can be fully evaluated by studying only soil and surficial conditions. Detailed subsurface investigations of geologic and hydrologic conditions are also usually necessary to determine an acceptable area for waste disposal.

Zaporozec and Hole (1976) present criteria which may be used for assessing terrain capability for a sanitary landfill site. These include slope, deposit thickness above impermeable layers, presence of bedrock or watertables, and proximity of waterbodies. These are general guidelines for preliminary assessment only. Every site investigation will reveal special problems and special conditions which may be exceptions to these generalized criteria and which must be dealt with in a site-specific context.

5.2.7 Potential as a Source of Topsoil

Topsoil is often added when existing soil conditions need to be improved for establishing and maintaining adopted vegetation, lawns, and gardens in a residential development. Properties considered in evaluating the suitability of topsoil are texture, soil drainage, salinity, thickness, stoneiness, slope, and fertility. Considered also are damage to the borrow area and to features (eg. slope, wetness, thickness of suitable materials) that determine the ease or difficulty of removing the soil (United States Department of Agriculture, 1971).

Table 5.1 Geological Hazards and Terrain Capability for Residential Settlement

Soil Parent Material Groups	Soil Association Components	Constraints Affecting Use For*							Geological Hazards**
		Septic Tank Disposal Fields	Foundations for Low Rise Dwellings	Road and Street Subgrade	Ease of Excavation	Sites for Sanitary Landfill	Source of Topsoil	Source of Sand and Gravel	
Floodplain deposits (Regosolic soils)	AS1,9-11; CN1,3; FA1,3; FD1,2; FE1,2; FF1,3; FJ1,2; FK1,2; FM1,3,9; FQ1,2; FR10; FS1,3; FT10; FU1,3; FV1,2; FZ1,3; GN10; KO10; L10;NW1,2; S1,2	severe	severe	severe	moderate	severe	moderate	moderate	inundation;shifting channels;bank erosion
Floodplain deposits (Gleysolic Soils)	AS3,11,12, CN10,11; FA10,11; FD10,11; FE10,11; FF10,11; FJ10,11; FK10,11; FM10,11; FQ10,11; FS10,11; FU10,11; FV10,11; FZ10,11; KO11; L11; MA10; NW3,11; S3,10,11	severe	severe	severe	severe	severe	severe	severe	inundation;shifting channenls;bank erosion
Fluvial fans (relatively fine texture)	CA1-4; FO1-4,9; FP1-4; GE1-4; GZ1-4; MA1-3	moderate	moderate	moderate	slight	moderate	slight	moderate	inunation;shifting channels;bank erosion; debris, mud or earth flows.
Fluvial fans (relatively coarse texture)	FR1-4; FT1-3	moderate	slight	slight	slight	severe	moderate	slight	inundation;shifting channels;bank erosion; debris, mud or earth flows.
Fluvial terraces and fluvioglacial terraces, plains and fans (coarse texture)	FX1,2,9; GB1-4; GC1-4; GL1-4; GN1-4; GR1-4; GT1-4; GY1-4; KA1-4; KG1-4; KR1-4	severe	slight	slight	slight	moderate	moderate	slight	-
Fluvial, fluvio-glacial and eolian deposits (sandy surface texture)	E1,2,4,9; F1,2,9; GD1-4; H1,3: KE1-4; KO1-4; L1-3; MY1-4; SA1,3,9,10	severe	slight	slight	slight	moderate	slight	slight	wind erosion

Table 5.1 (Continued) Geological Hazards and Terrain Capability for Residential Settlement

Soil Parent Material Groups	Soil Association Components	Constraints Affecting Use For*							Geological Hazards**
		Septic Tank Disposal Fields	Foundations for Low Rise Dwellings	Road and Street Subgrade	Ease of Excavation	Sites for Sanitary Landfill	Source of Topsoil	Source of Sand and Gravel	
Eolian deposits (silty texture)	KY1-2,4,9	slight	slight	slight	slight	slight	slight	moderate	wind erosion
Glaciolacustrine terraces and plains (relatively fine texture)	AZ1-3; LL1-4; LN1-4; LY1-4; M1,2,4	moderate	moderate	moderate	slight	slight	slight	severe	failing; piping; gullying
Organic deposits	OD1,10,11; OL1,11; ON1,9,11; OS1,11	severe	severe	severe	severe	severe	severe	severe	
Deep colluvium (relatively fine texture)	CC1-4; CK1,3,4; CS1,4,9; CT1-4; CX1-4; CZ1-4,9	severe	severe	severe	moderate	severe	moderate	severe	rockslide; rockfall
Deep colluvium (relatively coarse texture)	CAI1-4; CB1-4; CE1-4; CF1,3; CG1-3; CH1-4; CI1-4; CJ1-4; CL1-4; CLD1-4; CM1-4; COL1,2,4; COR1-4; COY1-4,9,10; CP1-4; CQ104; CR1-4; CU1-4; CW1-4; CY1-4,9	severe	severe	severe	moderate	severe	severe	severe	rockslide; rockfall
Shallow colluvium (<1m over bedrock)	BB1-6; BC1-6; BF1-6; BH1-6; BK1-6; BN1-6; BO1-6; BP1-6; BS1-6; RA1-6; RB1-6; RC1-6; RD1-6; RE1-6; RF1-6; RG1-6; RH1-6; RI1-6; RJ1-6; RK1-6; RN1-6; RP1-6; RR1-6; RS1-6; RT1-6; RU1-6; RY1-6	severe	severe	severe	severe	severe	severe	severe	rockslide; rockfall
Talus, scree	YK1,9-11, YR1,9	severe	severe	severe	severe	severe	severe	severe	rockslide; rockfall

Table 5.1 (Continued) Geological Hazards and Terrain Capability for Residential Settlement

Soil Parent Material Groups	Soil Association Components	Constraints Affecting Use For*							Geological Hazards**
		Septic Tank Disposal Fields	Foundations for Low Rise Dwellings	Road and Street Subgrade	Ease of Excavation	Sites for Sanitary Landfill	Source of Topsoil	Source of Sand and Gravel	
Deep glacial till (relatively fine texture)	CO1-4; MK1-4; ML1-4; MO1-4; MR1-4	moderate to severe	moderate to severe	moderate to severe	moderate	moderate	moderate	severe	
Deep glacial till (medium texture)	CD1-4; FL1-4; K1-4; MC1-4; MD1-4; ME1-4; MG1-4; MM1-4; MP1-4,9,10; MS1-4; MT1-4; MW1-4; MX1-4; MZ1-3; P1,3-4,9,10; SN1-4; SP1-4; SS1-4; SY1-4; WY1-4	moderate	moderate	moderate	moderate	moderate	moderate	severe	-
Deep glacial till (relatively coarse texture)	MF1-4; MN1-4; MU1-4;2; SL1-4	slight	slight	slight	slight	moderate to severe	moderate	moderate	-
Shallow glacial till (<1m over bedrock)	All #5 soil association components for till derived soils; (eg. CO5, CD5, MF5..)	severe	severe	severe	moderate	severe	moderate	severe	-
Avalanche tracks and run-out zones (all deposits)	All #8 soil association components (eg., BB8; CC8..)	severe	severe	severe	moderate to severe	severe	moderate	severe	avalanching; debris, mud or earth flow; rock slide; rock fall
Eroded or failing deposits (Regosolic soils)	All #7 soil association components (eg., CD7; RE7..)	severe	severe	severe	severe	severe	moderate to severe	severe	failing; gullying
Saline/alkaline deposits	M10; P11; SA11	moderate to severe	slight to moderate	slight to moderate	slight	slight to moderate	moderate to severe	slight to severe	-

* Constraint classes and interpretative methodology in Maynard, 1979. **Geological hazard classification in Ryder, 1981.

5.3 GEOLOGICAL HAZARDS

Geological hazards are geomorphic processes which can cause catastrophic destruction and are usually impossible, or unfeasible, to prevent. The most effective way of minimizing risk is by avoidance of these hazards. The system used to rate geological hazards in the East Kootenays is fully explained in Ryder, 1981 and is only briefly summarized here.

Ryder, 1981 lists potential hazards that might be encountered in the East Kootenays and suggests criteria useful in their detection in the field. Field examination however, is not intended as a substitute for proper engineering analysis. Symbols on the terrain map in Ryder, 1981 may be evaluated to identify geologic processes such as:1) rock slides, debris slides, 2) rock falls, 3) mudlflows, slope failure in colluvium, 4) avalanches, debris avalanche, 5) gullying, 6) wind erosion, 7) inundation, shifting channels or bank erosion related to flooding, 8) slumps, falling blocks, piping or failing slopes in glaciolacustrine or, 9) karst solution. These may then be interpreted as presenting potential geologic hazards, depending on the land uses under consideration.

Potential geologic hazards, extracted from Ryder, 1981, are included in Table 5.1.

5.4 CLIMATE AND SOIL CAPABILITY FOR AGRICULTURE

5.4.1 Climate Capability for Agriculture

Climate constitutes the basic limitation for agricultural land uses regardless of soil conditions. Thus, it forms the basis for soil capability for agriculture ratings. The East Kootenay area, due to its mountainous terrain, includes a wide variety of climates. These have been categorized into Climate Capability for Agriculture classes on the basis of freeze free period, number of growing degree days above 5^{0}C, climatic moisture deficit (or surplus) and typical crop ranges. The classes are defined in Climate Division (1978).

Climate Capability for Agriculture ratings are given in Table 5.2 for each soil association. The climate data used to determine the ratings was derived from 'Lands of the East Kootenay' (Runka, 1969).

Climate Class One is not present in the East Kootenays. However, fairly extensive areas of Class 2 occur on the floor of both the Rocky Mountain Trench and the Elk Valley below Sparwood. Raspberries, strawberries and warm season vegetables such as lettuce, carrots, beets, radishes and turnips (but not corn, tomatoes or onions), can be successfully grown in the 75 to 89 day freeze free period. Class 3 climates also occur on valley floors, but further into the mountains and at slightly higher elevations. Typical crops that can be grown in the 60 to 74 day freeze free period include cool season vegetables such as potatoes, lettuce, peas, spinach, cauliflower and cabbage. The shorter (50 to 59 days) freeze free period of Class 4 permits only the cultivation of hardy varieties of cool season vegetables and forage crops. Only forage crops can be produced in a Class 5 climate (<50 freeze free days). At higher elevations, only native forages suitable for grazing can be grown. Climate Capability for Agriculture Classes and Subclasses are more fully discussed in Runka (1969), British Columbia Land Inventory (1972), and in Kenk and Cotic (1983).

5.4.2 Soil Capability for Agriculture

The Soil Capability for Agriculture classification is based on climate (Section 5.4.1), and on soil characteristics that limit the range of regionally suited crops. Good management practices are assumed, but distance to markets, kind of roads, location, size of farms, characteristics of land ownership, cultural patterns and the skill or resources of individual farmers are not criteria for capability ratings. The classification groups soils into 7 classes with Class 1 having no limitations for production of regionally adapted crops and Class 7 having no capability for arable agriculture or natural grazing.

Soil capability for Agriculture mapping was not conducted during the current East Kootenay soil survey project as the mapping had been previously completed and published (Canada Land Inventory, 1970, 1970a, 1970b, 1971, 1972d). Results reported in Table 5.2 for each soil association are summarized from the above mentioned maps, from 'Lands of the East Kootenay' (Runka, 1969) and from field observations during the soil mapping field program. Classification methodology utilized in preparing the published maps was Soil Capability Classification for Agriculture (Canada Land Inventory, 1965).

The generally mountainous topography of the East Kootenays places a wide range of both climatic and soil limitations on the land capability for agriculture. Class 1 and 2 Capability do not occur in the area, primarily because of marginal climate (Canada Land Inventory 1970, 1970a, 1970b, 1971, 1972d). Classes 3 and 4 only occur on the floors of the Rocky Mountain trench and the Elk River Valley on stone-free, relatively fine to medium textured soils developed on fluvial fans, floodplains and glaciolacustrine terraces with favourable topography. Class 5 Soil Capability for Agriculture occurs on the floors of larger valleys in the mountains (where climate is dominantly limiting), as well as in the Trench and Elk River Valley where soil limitations dominate. Class 5 soils occur primarily on floodplains (inundation and soil wetness limitations), fluvial fans and fluvioglacial terraces (low soil moisture holding capacity and stoniness limitations) and on some basal till deposits (stoniness and adverse topography limitations). Class 6 and 7 soils occur throughout the mountainous areas, particularly on soils derived from colluvial deposits (stoniness, adverse topography, shallowness to bedrock and low soil moisture holding limitations) and on morainal materials (stoniness, adverse topography and shallowness to bedrock limitations).

Soil Capability for Agriculture classes and subclasses are more fully described in Canada Land Inventory (1965).

5.5 INTERPRETATIONS FOR FORESTRY

Soils data and mapping represent significant inputs into forestry planning and management. To achieve this several soil based, forestry related interpretations are provided in Table 5.2 for each soil association identified in the East Kootenay project area. These include Canada Land Capability for Forestry productivity ratings, potential for Forest Regeneration, Windthrow Hazard, and Soil Susceptibility to Damage by Disturbance. The methodology described by McCormack (1967) was employed for the Land Capability for Forestry ratings while the other forestry interpretations were modified from Kowall (1974).

Forest management practices, as well as environmental factors are highly significant in determining the success of forest regeneration, growth and harvesting. In this report, only environmental factors are considered in the interpretations (ie., physical and chemical soil data, climate, terrain and vegetation information described for each soil association). The generalized ratings given are not intended to replace interpretations based upon comprehensive analysis of site specific information; they are intended to provide a link between soil report data and forest management in general terms.

5.5.1 Land Capability Classification for Forestry

As with Soil Capability for Agriculture, Land Capability for Forestry classification for the East Kootenays has been previously compiled and published (Canada Land Inventory, 1972, 1972a, 1972b, 1972c, 1973.) Consequently, new mapping was not undertaken during the East Kootenay soil survey program. A limited number of plots were measured, however, to strengthen areas where earlier mapping was felt to be weak. Plots in deciduous species were measured on floodplains and Gleysolic soils (only coniferous species had been measured previously) and in coniferous, high elevation forest that were not accessible by road during the previous forest capability mapping program. Results reported in Table 5.2 for each soil association are summarized from the previously published maps, the newly measured plots, and from information contained in Runka (1969).

The Land Capability for Forestry classification consists of groups of soils that have the same inherent ability to produce commercial timber. The classes are defined in terms of growth expressed in m^3/ha/yr. Class 1 lands have mean annual increments between 7.8 and 9.1 m^3/ha/yr while Class 7 lands have increments less than 0.7 m^3/ha/yr. Classes 2 to 6 are uniformly distributed between these extremes. The symbols consist of the class rating with letter subscripts indicating the soil or land characteristic(s) limiting productivity to the indicated class.

Some of the important factors on which the classification is based include:

1. Each soil association in assigned to a class on the basis of all known or inferred information about the soil, including depth, moisture, fertility, landform, climate and vegetation.

2. Each capability class is defined by a productivity range based on the mean annual increment expressed in m^3/ha/yr of gross merchantable wood to a minimum tree diameter of 10 cm. Thinnings, bark and branches are not included. The productivity is determined in "normal", ie., fully-stocked natural stands.

3. The following are not considered: location, access, distance to markets, size of units, ownership, present state of special crops such as Christmas trees.

4. The classes are based on the lands natural state without improvement such as fertilization, drainage or amelioration practices.

5. Tree species best adapted for particular sites and which appear most productive, are identified in the capability symbol. For a more precise guidelines on species suitability, Utzig et al. (1978) should be consulted and used in conjunction with the soils and forestry capability information.

Land Capability for Forestry Class 1 occurs in the East Kootenays on naturally subirrigated soils on floodplains and on relatively fine textured fluvial fans (Canada Land Inventory, 1972, 1972a, 1972b, 1972c, 1973). Class 2 also occurs on floodplain soils (with soil moisture excess and inundation limitations), and on relatively fine to medium textured fluvial fans, colluvial, basal till and glaciolacustrine deposits (several minor soil limitations on each). Class 3 soils are common at higher elevations on medium to relatively fine textured colluvial deposits, gravelly fluvioglacial deposits (soil moisture deficiency and stoniness limitations) and on basal tills (colder climate limitation). Class 4 is common on soils derived from colluvial and gravelly fluvioglacial deposits (both with stoniness and soil moisture deficiency limitations) and on basal tills (colder climate and subsurface restriction to rooting limitations). Class 5 Land Capability for Forestry commonly occurs on soils derived from shallow colluvium (soil moisture deficiency, shallowness to bedrock and stoniness limitations), and on fluvioglacial, fluvial, glaciolacustrine and eolian deposits on drier sites (aridity limitation). Class

6 occurs on soils under primarily grassy vegetation (aridity), in the krummbolz subzone (cold temperature limitation), in alpine areas (cold climate limitation) and on talus (stoniness and soil moisture McCormack (1967).

5.5.2 Natural Regeneration Potential

Forest regeneration, especially natural regeneration, is often limited by various environmental factors. Major environmental factors affecting forest regeneration include; soil drainage and texture, depth to bedrock, soil temperature and fertility, plasticity, bulk density, alkalinity, salinity and available water storage capacity. These factors were evaluated for each soil association to determine its potential to regenerate to an acceptable level of natural stocking. Factors much as the condition of the seed bed, distance from, and presence of adequate seed sources, and the shade requirements of various tree seedings, although important, are not evaluated in the ratings. The ratings do not consider management inputs, and are not intended as predictors of likelihood of success of forest regeneration management practices. The ratings are confined, as are all other ratings for subsequent interpretations, to evaluations based upon environmental constraints, or hazards. For soils with a Low Natural Regeneration Potential, major natural regeneration problems may be expected and artificial regeneration will likely be required. A high potential indicates that natural regeneration problems are not likely.

5.5.3 Windthrow Hazard

Ratings for windthrow hazard consider only those environmental factors that potentially limit the likelihood of a forest stand remaining windfirm until harvested. Forest management practices such as species planted, or characteristics of the stand edge are not considered. Environmental factors influential in determining hazards of windthrow include; soil depth, topographic position, soil texture, soil compaction, soil alkalinity or salinity, drainage and depth to water table.

Other factors important in windthrow hazard assessment, but not considered in the ratings are; rooting characteristics of individual tree species, the age and general condition of the stand, exposure to wind, extent of exposed forest edge, and stand density.

Soils with a Low windthrow hazard are generally deep, moderately coarse to coarse textured, well-drained and on subdued slopes. High hazard soils are generally shallow to bedrock and steep.

5.5.4 Soil Susceptability to Damage by Disturbance

Soil damage by disturbance considers only the deterioration of soil structure, soil compaction (increase in bulk density) and puddling which may occur during logging, and road and skid trail construction. Soil compaction is especially important when plant growth and productivity are considered. Damage usually occurs when the soils are wet. When wet, plastic soils are disturbed by logging or other traffic, the pore space and size can be so reduced that the soil becomes practically impervious to air and water. When these soils dry, they usually become hard and dense. Soil factors influential in determining soil susceptibility to damage include; soil wetness, soil texture, coarse fragment content, plasticity and slope.

Soils with a Low susceptibility to damage by disturbance are generally moderately coarse or coarse textured, well to rapidly drained and on gentle topography. Soils likely to incur major damage are rated as having a High susceptability and generally include those that are fine textured and wet.

5.6 SOIL INTERPRETATIONS FOR RECREATION

Soil data and soil maps can provide significant inputs into recreational planning and development. In order to summarize some of the data from the East Kootenay soil survey for recreational purposes, interpretations of capability for, or constraints limiting, various recreational uses are given in Table 5.3 for each soil association component. Interpretations include; Physical Carrying Capacity for Outdoor Recreation, and Limitations for Campsite and Picnic Areas, Playgrounds, and Paths and Trails. The methodology described in Block and Hignett (1977) was employed in evaluating Physical Carrying Capacity for Outdoor Recreation interpretations while interpretations of Limitations for Campsite and Picnic Areas, Playgrounds, and Paths and Trails, were adapted from interpretative tables in Montgomery and Edminister (1966).

The Physical Carrying Capacity for Outdoor Recreation interpretation is generally applied to groups of soils having similar soil and landform characteristics and can be effectively utilized for extensive evaluations for recreational land uses. The interpretations for Campsites and Picnic Areas, Playgrounds, and Paths and Trails, are more specific in referring to particular soil conditions and are primarily intended for more specific or intensive recreational land uses. The ratings for these latter interpretations are not intended, however, to be substitutes for decisions based upon site specific engineering data.

The recreation features and the physical capacity of the land to accommodate recreational activities are fully discussed in Collins (1981).

5.6.1 Physical Carrying Capacity for Outdoor Recreation

The most significant physical parameters involved in determining the Physical Carrying Capacity for Outdoor Recreation (Block and Hignett, 1977) are soil, terrain and topographic characteristics, all of which are included in the soil association descriptions in Chapter Four. The parameters include soil texture, wetness and depth, and topography (slope) and geological hazards. In order to link the East Kootenay recreation and soil reports, the Physical Carrying Capacity for Outdoor Recreation of each soil association component is recorded in Table 5.3.

5.6.2 Soil Limitations for Campsite and Picnic Areas

Campsite and picnic areas are often subject to very heavy usage at peak periods. Heavy use may, in fact, coincide with rainy weather which can result in considerable mud, soil compaction and puddling, and inconvenience for the facility users. The main soil criteria involved in determining the limitations of soils for campsites and picnic areas are soil texture and drainage, permeability, soil depth and geological hazards.

Soils with a High capability for campsite and picnic areas are generally well drained and permeable, relatively coarse texture, deep and not subject to flooding. Low capability soils are generally poorly drained, slowly permeable, relating fine textured, stony and have bedrock at, or near, the surface.

5.6.3 Soil Limitations for Playgrounds

Playgrounds generally include sporting activity fields and, consequently, slope is important in determining the suitability of soils for this use. Other significant soil criteria for determining soil suitability for playgrounds include; soil drainage, texture, permeability, soil depth, and geological hazards.

Soils with High capabilities for playgrounds are generally relatively level, well drained, permeable, relatively coarse textured (but without coarse fragments), deep, and not subject to geological hazards such as flooding. Low capability soils include those that have one or more of the following limitations: poor drainage, low permeability, fine texture, high coarse fragment content, shallow depth to bedrock, steep slopes, and are subject to flooding.

5.6.4 Soil Limitations for Paths and Trails

The trafficability, or ability of the soil to withstand wear is of prime concern when evaluating potential routes for paths and trails. Soil criteria considered include; soil drainage, depth to water table, soil texture, coarse fragment content, depth to bedrock and geological hazards.

Soils with few limitations for paths and trails are generally well drained, relatively coarse textured, deep to both bedrock and water table, have subdued topography, and are not subject to geological hazards. Soils with severe limitations have poor drainage, fine textures, shallow depths to bedrock and/or water table, steep slopes and are subject to geologic hazards.

5.7 SOIL INTERPRETATIONS FOR WILDLIFE

Soil and terrain data and maps (including data in the soil association descriptions in Chapter Four) were utilized in wildlife capability mapping in the East Kootenays. In order to link the East Kootenay wildlife and soil reports, wildlife capability interpretations for each soil association are presented in Table 5.4 Methodology utilized in determining the wildlife capability interpretations is according to Demarchi et al. (1983). Information on the wildlife resource in the East Kootenays and capability of the land to accommodate wildlife is fully documented in Demarchi (1986).

5.7.1 Wildlife Capability Classification

Environmental data described for the soil associations of this report constitute part of the data required for Wildlife Capability Classification. Factors considered include; soil drainage, soil alkalinity or salinity, topography and geological hazards. The Ungulate Biophysical Capability of the soil associations is shown in Table 5.4.

Wildlife (Ungulate) Capability Ratings are given for elk (E), mule (M) and whitetail (W) deer, moose (X), mountain sheep (S), and mountain goat (G). Capability classes are be superscripted to the letter symbol of the assigned species (to indicate winter range) or subscripted (summer range), eg. E^3 = Class 3 winter range for elk. A number of ratings may be given for one ungulate species in view of the fact that highly significant environmental conditions (eg., climate, vegetative cover and man's influences), affect the ratings.

Soil associations with Class 1 Wildlife Capability have a very high capability to support the assigned ungulate species, whereas a Class 6 rating indicates no capability.

Table 5.2 **Agriculture and Forestry Interpretations***

Soil Association Component(s)	Agriculture		Forestry			
	Climate Capability for Agriculture	Soil Capability for Agriculture	Land Capability for Forestry	Natural Forest Regeneration Potential	Windthrow Hazard	Relative Susceptibility of Soils to Damage by Disturbance
AS1,3,9,10	3G	5IP	2S	high	low	low
AS11,12	3G	6WI	6WI	low	moderate	low
AZ1-3	3GF	4X	2S	high	moderate	high
AZ7	3GF	6ED	3ED	high	moderate	high
BB1-6	6G	7TR	6ER	moderate	high	high
BB7,8	6G	7ER	7ER	low	high	high
BC1-6; BO1-6; BP1-6; RF1-6; RG1-6; RT1-6	6GH	7TR	5HR	moderate	high	moderate
BC7; BO7; BP7; RF7	6GH	7ER	6ER	moderate	high	moderate
BC8; BO8; BP8; RF8; RG8; RT8	6GH	7ER	7ER	low	high	moderate
BF1-6; RC1-6; RP1-6; RS1-6	5G	7TR	5HR	moderate	high	moderate
BF7; RC7; RP7; RS7	5G	7ER	6ER	low	high	moderate
BH1-6; BK1-6; RS8	6G	7TR	5HR	moderate	high	moderate
BH7; BK7	6G	7ER	6ER	low	high	moderate
BH8; BK8	6G	7ER	7ER	low	high	moderate
BK - see BH						
BN1-6	5G	7TR	5R	moderate	high	moderate
BN7	5G	7ER	6ER	low	high	moderate
BN8	5G	7ER	7ER	low	high	moderate
BO - see BC						
BP - see BC						
BS1-6; RH1-6	6G	7TR	5R	moderate	high	moderate
BS7; RH7	6G	7ER	6ER	low	high	moderate
BS8; RH8	6G	7ER	7ER	low	high	moderate
CA1-4	3GF	3C	1	high	high	high
CA7	3GF	5TE	2ED	moderate	high	high
CAI1-4; CE1-4	5G	6T	4M	high	low	low
CAI7; CE7	5G	6TE	4ME	moderate	low	low
CB1-4; CW1-4	6G	6T	4M	high	low	low
CB7; CW7	6G	6TE	5ME	moderate	low	low
CB8; CW8	6G	6TE	7E	low	low	low
CC1-4	5G	6T	2S	high	high	high
CC7	5G	6TE	3ED	moderate	high	high
CD1-4	3G	4TD	2S	high	high	high
CD5	3G	5TR	3RD	high	high	high
CD7	3G	5TE	3ED	moderate	high	high
CE - see CAI						
CE8	5G	6TE	7E	low	low	low

Table 5.2 (Continued) Agriculture and Forestry Interpretations*

Soil Association Component(s)	Agriculture		Forestry			
	Climate Capability for Agriculture	Soil Capability for Agriculture	Land Capability for Forestry	Natural Forest Regeneration Potential	Windthrow Hazard	Relative Susceptability of Soils to Damage by Disturbance
CF1,3	6GH	7T	4H	high	low	low
CG1-3; CR1-4	5G	6T	4M	high	low	low
CG7; CR7	5G	6TE	5ME	moderate	low	low
CH1-4; CI1-4; CM1-4; CQ1-4; CY1-4,9	6GH	7T	4H	high	low	low
CH7; CI7; CM7; CQ7; CY7	6GH	7TE	5HE	moderate	low	low
CH8; CI8; CM8; CQ8; CY8	6GH	7TE	7EH	low	low	low
CI-see CH						
CJ1-4; CU1-4	6G	7T	4M	high	low	low
CJ7; CU7	6G	7TE	5ME	moderate	low	low
CJ8; CU8	6G	7TE	7E	low	low	low
CK1,3,4	5G	6T	3S	high	high	high
CK7	5G	6TE	4ED	moderate	high	high
CL1-4	6G	7T	4H	high	low	low
CL7	6G	7TE	5HE	moderate	low	low
CL8	6G	7TE	7EH	low	low	low
CLD1-4; COR1-4	5G	6T	4M	high	low	low
CLD7; COR7	5G	6TE	5ME	moderate	low	low
CM - see CH						
CN1,3,10	2G	5FI	1	high	low	low
CN11	2G	6WI	6WI	low	moderate	low
CO1-4	3G	4TD	2S	high	high	low
CO5	3G	4TR	3RD	high	high	high
CO7	3G	5TE	3ED	moderate	high	high
COL1,2,4	2G	6T	4AM	moderate	high	high
COL7	2G	6TE	5ME	moderate	low	low
COR - see CLD					low	low
COY1-4,9,10	6GH	7T	6HP	low	moderate	high
COY7,8	6GH	7TE	7HE	low	moderate	low
CP1-4	5G	6T	4H	high	low	low
CP7	5G	6TE	5HE	moderate	low	low
CP8	5G	6TE	7E	low	low	low
CQ - see CH						low
CR - see CG						
CS1,4,9; CZ1-4,9	6GH	7T	3S	high	high	high
CS7; CZ7	6GH	7TE	4EH	moderate	high	high
CS8; CZ8	6GH	7TE	7EH	low	high	high

Table 5.2 (Continued) Agriculture and Forestry Interpretations*

Soil Association Component(s)	Agriculture		Forestry			
	Climate Capability for Agriculture	Soil Capability for Agriculture	Land Capability for Forestry	Natural Forest Regeneration Potential	Windthrow Hazard	Relative Susceptability of Soils to Damage by Disturbance
CT1–4; CX1–4	6G	7T	3S	high	high	high
CT7; CX7	6G	7TE	4ED	moderate	high	high
CT8; CX8	6G	7TE	7ED	low	high	high
CU - see CJ						
CW - see CB						
CX - see CT						
CY - see CH						
CZ - see CS						
E1,2,4,10	2GF	4M	5M	moderate	low	low
F1,2,9	2GF	5M	4MA	moderate	low	low
FA1,3,10; FD1,3,10; FZ1,3,10	5GH	5CP	2S	high	low	low
FA11; FD11; FU11; FZ11	5GH	6CW	6WI	low	moderate	low
FD - see FA						
FE1,2,10; FJ1,2,10; FK1,2,10; FV1,2,10	6GF	6C	2S	high	low	low
FE11; FJ11; FK11	6GF	6CW	6WI	low	low	low
FV11	5G	6T	4M	high	low	low
FF1,3,10	5G	5CP	2S	high	low	low
FF11	5G	6CW	6WI	low	low	low
FJ - see FE						
FK - see FE						
FL1–4	3G	5TD	4MD	high	moderate	moderate
FL5	3G	5TR	5MR	high	high	moderate
FL7	3G	6TE	5ME	moderate	high	moderate
FM1,3,9,10	5GH	5C	2S	high	low	moderate
FM11	5GH	6CW	6WI	low	moderate	moderate
FO1–4,9; FP1–4	5GF	5C	2S	high	high	high
FO7; FP7	5GF	6TE	3ED	moderate	high	high
FO8; FP8	5GF	6TE	7E	low	high	high
FP - see FO						
FQ1,2,10	6GF	6C	2S	high	low	moderate
FQ11	6GF	6CW	6WI	low	moderate	moderate
FR1–4	5GF	5C	3PM	high	low	low
FR7	5GF	5TP	4EM	moderate	low	low
FR8	5GF	6TE	7E	low	low	low
FR10	5GF	6WI	5WI	low	moderate	low
FS1,3	2GF	4PI	1	high	low	low
FS10	2GF	5WI	1	high	low	low

Table 5.2 (Continued) Agriculture and Forestry Interpretations*

Soil Association Component(s)	Agriculture		Forestry			
	Climate Capability for Agriculture	Soil Capability for Agriculture	Land Capability for Forestry	Natural Forest Regeneration Potential	Windthrow Hazard	Relative Susceptability of Soils to Damage by Disturbance
FS11	2GF	5WI	6WI	low	moderate	low
FT1-3	5GF	5C	4PM	high	low	low
FT7	5GF	6TP	5EM	moderate	low	low
FT8	5GF	6TP	7E	low	moderate	low
FT10	5GF	6WI	5WI	low	moderate	low
FU - see FA						
FV - see FE						
FX1,2,9	2GF	5PM	5PM	moderate	low	low
FZ - see FA						
GB1-4; GD1-4	5G	5C	3M	high	low	low
GB7; GD7	5G	7TE	5EM	moderate	low	low
GB8; GD8	5G	7TE	7E	low	low	low
GC1-4; GL1-4	6GH	6CP	3PM	high	low	low
GC7; GL7	6GH	7TE	5EM	moderate	low	low
GC8; GL8	6GH	7TE	7E	low	low	low
GD - see GB						
GE1-4	6GF	6C	3S	high	high	high
GE7	6GF	6TE	4EH	moderate	high	high
GE8	6GF	6TE	7E	low	high	high
GL - see GC						
GN1-4	3GF	5PM	4MP	moderate	low	low
GN10	3GF	5PI	2S	high	low	low
GR1-4; GY1-4; KR1-4	5G	6PM	4PM	moderate	low	low
GR7; GY7; KR7	5G	7TE	5EM	moderate	low	low
GY8; KR8	5G	7TE	7E	low	low	low
GT1-4	5G	6PM	3PM	moderate	low	low
GT7	5G	7TE	5EM	moderate	low	low
GT8	5G	7TE	7E	low	low	low
GY - see GR						
GZ1.4,9	6GF	6C	3S	high	high	high
GZ7	6GF	7TC	4EH	moderate	high	high
GZ8	6GF	7TC	7EH	low	high	high
H1,3	2G	4M	6M	low	high	low
H7	2G	4MI	6M	low	low	low
K1-4	2G	5TD	5AD	moderate	moderate	moderate
K5	2G	5TR	6RA	moderate	high	moderate
K7	2G	6TE	6AE	moderate	moderate	moderate
KA1-4	5G	6PM	5PM	moderate	low	low
KA7	5G	7TE	5EM	moderate	low	low

Table 5.2 (Continued) Agriculture and Forestry Interpretations*

Soil Association Component(s)	Agriculture		Forestry			
	Climate Capability for Agriculture	Soil Capability for Agriculture	Land Capability for Forestry	Natural Forest Regeneration Potential	Windthrow Hazard	Relative Susceptability of Soils to Damage by Disturbance
KA8	5G	7TE	7E	low	low	low
KE1-4	3G	5MP	4PM	moderate	low	low
KE7	3G	7TE	5EM	moderate	low	low
KG1-4	6GH	6CP	3PM	high	low	low
KG7	6GH	7TE	4EM	moderate	low	low
KG8	6GH	7TE	7E	low	low	low
KO1-4	2GF	5M	5MA	moderate	low	low
KO10	2GF	5WI	1	high	low	low
KO11	2GF	6WI	6WI	low	moderate	low
KR - see GR						
KY1,2,4,9	2GF	3M	5A	moderate	low	low
L1-3	2GF	3M	5MA	moderate	low	low
L10	2GF	5WI	1	high	low	low
L11	2GF	6WI	6WI	low	moderate	low
LL1-4	6GH	6C	2S	high	moderate	high
LL7	6GH	7ED	3EH	moderate	moderate	high
LL8	6GH	7ED	7EH	low	moderate	high
LN1-4;LY1-4	5G	5C	2S	high	moderate	high
LN7; LY7	5G	6ED	3ED	moderate	moderate	high
LN8; LY8	5G	6ED	7E	low	moderate	high
LY - see LN						
M1.2,4	2GF	4X	5DA	moderate	moderate	high
M7	2GF	6ED	5DE	moderate	moderate	high
M10	2GF	6ND	6DN	low	moderate	high
MA1-3	3GF	3C	2S	high	moderate	high
MA7	3GF	5TE	3ED	moderate	moderate	high
MA10	3GF	6WI	6WI	low	moderate	high
MC1-4	6GH	6C	3S	high	low	low
MC5	6GH	6TR	4HR	high	moderate	low
MC7	6GH	6TE	4EH	moderate	low	low
MC8	6GH	6TE	7EH	low	low	low
MD1-4	3G	5TP	4PM	high	low	low
MD5	3G	5TR	5RM	high	moderate	low
MD7	3G	6ET	5EM	moderate	high	low
ME1-4	6GF	6TD	3S	high	high	high
ME5	6GF	6TR	4RH	high	high	high
ME7	6GF	6TE	4EH	moderate	high	high
ME8	6GF	6TE	7EH	low	high	high
MF1-4	3G	5TM	4PM	high	low	low

Table 5.2 (Continued)   Agriculture and Forestry Interpretations*

Soil Association Component(s)	Agriculture		Forestry			
	Climate Capability for Agriculture	Soil Capability for Agriculture	Land Capability for Forestry	Natural Forest Regeneration Potential	Windthrow Hazard	Relative Susceptability of Soils to Damage by Disturbance
MF5	3G	5RM	5MR	high	moderate	low
MF7	3G	6ET	5EM	moderate	low	low
MG1-4; MX1-4	6GH	6C	3S	high	low	moderate
MG5; MX5	6GH	6TR	4HR	high	moderate	moderate
MG7; MX7	6GH	6TE	4EH	moderate	low	moderate
MG8; MX8	6GH	6TE	7EH	low	low	moderate
MK1-4; MO1-4; MT1-4; MW1-4	5G	6TD	2S	high	high	high
MK5; MO5; MT5; MW5	5G	6TR	3RD	high	high	high
MK7; MO7; MT7; MW7	5G	6TE	3ED	moderate	high	high
MK8; MO8; MT8; MW8	5G	6TE	7ED	low	high	high
ML1-4; MR1-4	6GF	6C	3S	high	high	high
ML5; MR5	6GF	7CR	4RH	high	high	high
ML7; MR7	6GF	7TE	4EH	moderate	high	high
ML8; MR8	6GF	7TE	7EH	low	high	high
MM1-4; SY1-4	5G	6TD	3S	high	low	moderate
MM5; SY5	5G	6TR	4RD	high	moderate	moderate
MM7; SY7	5G	6TE	4ED	moderate	low	moderate
MM8; SY8	5G	6TE	7ED	low	low	moderate
MN1-4	6GH	6CT	4HM	high	low	low
MN5	6GH	6TR	5HR	high	moderate	low
MN7	6GH	6TE	5EH	moderate	low	low
MN8	6GH	6TE	7EH	low	low	low
MO - see MK						
MP1-4	6GH	7CT	7H	low	high	low
MP5	6GH	7CR	7HR	low	high	low
MP7	6GH	7EC	7EH	low	high	low
MP8	6GH	7EC	7EH	low	high	low
MR - see ML						
MS1-4	3G	5T	4M	high	low	moderate
MS5	3G	5TR	5MR	moderate	moderate	moderate
MS7	3G	6TE	5EM	moderate	low	moderate
MT - see MK						
MU1-4	5G	6TM	4PM	high	low	low
MU5	5G	6TR	5MR	high	low	low
MU7	5G	6ET	5EM	moderate	low	low
MU8	5G	6ET	7EM	low	low	low
MW - see MK						
MX - see MG						

Table 5.2 (Continued) Agriculture and Forestry Interpretations*

Soil Association Component(s)	Agriculture		Forestry			
	Climate Capability for Agriculture	Soil Capability for Agriculture	Land Capability for Forestry	Natural Forest Regeneration Potential	Windthrow Hazard	Relative Susceptibility of Soils to Damage by Disturbance
MY1-4	3GF	5M	3H	high	low	low
MY7	3GF	7TE	4EM	moderate	low	low
MZ1-3	3G	5T	2S	high	low	moderate
MZ5	3G	5TR	4MR	high	moderate	moderate
MZ7	3G	6TE	4EM	moderate	low	moderate
NW1,2; S1,2	2GF	3WI	1	high	low	moderate
NW3; S3,10	2GF	6WI	1	high	low	moderate
NW11; S11	2GF	6WI	6WI	low	moderate	moderate
OD1,10,11	6GF	6WI	7WI	low	high	low
OL1,11	2GF	6WI	7WI	low	high	low
ON1,9,11	5GF	6WI	7WI	low	high	low
OS1,11	3GF	6WI	7WI	low	high	low
P1,3,9,10	2G	5TM	6A	low	low	low
P5	2G	6TR	6AR	low	moderate	low
P7	2G	6TE	6AE	low	low	low
P11	2G	6TN	6AN	low	low	low
RA1-3,5,6,9,10 RJ1-3,5,6	6X	7TR	7RH	low	high	high
RA7; RJ7	6X	7ER	7ER	low	high	high
RA8; RJ8	6X	7ER	7ER	low	high	high
RB1-6	2G	7TR	5MR	moderate	high	moderate
RB7	2G	7ER	6ER	moderate	high	moderate
RC - see BF						
RD1-6	6G	7TR	5MR	moderate	high	moderate
RD7	6G	7ER	6ER	low	high	moderate
RD8	6G	7ER	7ER	low	high	moderate
RE1-6; RI1-6	5G	7TR	4MR	moderate	high	high
RE7; RI7	5G	7ER	5ER	moderate	high	high
RF - see BC						
RG - see BC						
RH - see BS						
RI - see RE						
RJ - see RA						
RK1-6; RN1-6	6GH	7TR	5RH	moderate	high	high
RK7; RN7	6GH	7ER	6ER	moderate	high	high
RK8; RN8	6GH	7ER	7ER	low	high	high
RN - see RK						
RP - see BF						
RR1-6	6GH	7TR	4R	moderate	high	high
RR7	6GH	7ER	5ER	moderate	high	high

Table 5.2 (Continued) Agriculture and Forestry Interpretations*

Soil Association Component(s)	Agriculture		Forestry			
	Climate Capability for Agriculture	Soil Capability for Agriculture	Land Capability for Forestry	Natural Forest Regeneration Potential	Windthrow Hazard	Relative Susceptability of Soils to Damage by Disturbance
RR8	6GH	7ER	7ER	low	high	high
RS - see BF						
RT - see BC						
RU1-6	6G	7TR	4R	moderate	high	high
RU7	6G	7ER	5ER	moderate	high	high
RU8	6G	7ER	7ER	low	high	high
RY1-6	3G	7TR	5MR	moderate	high	moderate
RY7	3G	7ER	6ER	low	high	moderate
SA1,3,9,10	2GF	5M	6MA	low	low	low
SA11	2GF	5MF	7AN	low	low	low
SL1-4	5G	6TM	3S	high	low	low
SL5	5G	6TR	4RM	high	moderate	low
SL7	5G	6ET	4EM	moderate	low	low
SL8	5G	6ET	7EM	low	low	low
SN1-4	6GH	6C	2S	high	low	low
SN5	6GH	6CR	3RH	high	moderate	low
SN7	6GH	6CE	3EH	moderate	low	low
SN8	6GH	6CE	7EH	low	low	low
SP1-4	5G	6TP	4PM	high	low	low
SP5	5G	6TR	5RM	high	low	low
SP7	5G	7TE	5EM	moderate	low	low
SP8	5G	7TE	7EM	low	low	low
SS1-4	6GF	6TD	3S	high	moderate	moderate
SS5	6GF	6TR	4RH	high	high	moderate
SS7	6GF	6TE	4EH	moderate	moderate	moderate
SS8	6GF	6TE	7EH	low	moderate	moderate
SY - see HM						
WY1,2,4	3G	5TP	5AM	moderate	low	low
WY5	3G	5TR	5AR	moderate	moderate	low
WY7	3G	6ET	6EA	low	low	low
YK1,9-11; YR1,9	6GH	7TP	7EP	low	low	low
YR - see YK						

* Class and subclass symbols for Climate Capability for Agriculture, Soil Capability for Agriculture and Land Capability for Forestry are defined in Climate Division (1978), Canada Land Inventory (1965) and McCormack (1967), respectively. Forestry interpretative classes and methodologies are defined in Kowall (1974).

Table 5.3 Soil Interpretations for Recreation*

Soil Parent Material Groups	Soil Association Components	Physical Carrying Capacity for Outdoor Recreation	Soil Limitations For		
			Campsite and Picnic Areas	Playgrounds	Paths and Trails
Floodplain deposits (relatively fine texture)	FD1; KO10; L10; MA10; NW1,2 S1,2	3 Hi Sf Sw	severe	severe	moderate
	FJ1,2; FQ1,2	4 Hi Sf Sw	severe	severe	moderate
	FD3,10,11; FJ10,11; FQ10,11; NW3,11; S3,10,11	5 Hi Sw	severe	severe	severe
Floodplain deposits (relatively coarse texture)	AS1,3,9-11; CN1,3; FA1,3; FE1,2; FF1,3; FK1,2; FM1,3,9; FT10; FS1,3; FR10; FV1,3; FZ1,3; GN10	3 Hi Sc Sw	severe	severe	moderate
	AS12, CN10, FA10,11; FE10,11; FF10,11; FK10,11; FM10,11; FS10,11; FU10,11; FV10,11; FZ10,11	5 Hi Sw	severe	severe	severe
Fluvial fans (relatively fine texture)	CA1-4; FO1-4,9; FP1-4; GE1-4; MA1-3	2 Sf	moderate	moderate	moderate
	GZ1,4,9	3 Sf Tu	moderate	moderate	moderate
Fluvial fans (relatively coarse texture)	FR1-4; FT1-3	2 Sc	slight	moderate	slight
Fluvial and fluvioglacial terraces, plains and fans (relatively coarse texture)	E1,2,4,9; FX1,2,9; GB1-4; GC1-4; GD1-4; GL1-4; GN1-4; GR1-4; GT1-4; GC1-4; H1,3; KE1-4; KO1-3; KR1-4; L1-3; MY1-4; SA1-3,9-11	2 Sc	slight	slight	slight
Eolian deposits	F1,2,9	2 Sc	slight	moderate	slight
	K1-4	3 Tu Sf	moderate	moderate	slight
Glaciolacustrine terraces and plains (relatively fine texture)	AZ1-3; LL1-4; LN1-4; LY1-4; M1,2,4,10	3 Sf Tu	moderate	moderate	moderate

Table 5.3 (Continued) Soil Interpretations for Recreation[a]

Soil Parent Material Groups	Soil Association Components	Physical Carrying Capacity for Outdoor Recreation	Soil Limitations For		
			Campsite and Picnic Area	Playgrounds	Paths and Trails
Organic deposits	OD1,10,11; OL1,11; ON1,9,11; OS1,11	5 So Sw	severe	severe	severe
Deep colluvial deposits (relatively) fine texture)	CC1-4; CK1,3,4; CS1-4,9; CT1-4; CZ1-4,9	4 Sf Ts	severe	severe	moderate
Deep Colluvial deposits (relatively coarse texture)	CAI1-4; CB1-4; CE1-4; CF1,3; CG1-3; CH1-4; CI1-4; CJ1-4; CL1-4; CLD1-4; CM1-4; COL1,2,4; COR1-4; CP1-4; CQ1-4; CR1-4; CU1-4; CW1-4; CY1-4,9	3 Ts Sb	severe	severe	moderate
	COY1-4,9,10	5 Ts Lg Lf	severe	severe	severe
Shallow colluvial deposits (relatively fine texture)	RE1-6; RI1-6; RK1-6; RN1-6; RR1-6; RU1-6	5 Sk Sf Ts	severe	severe	severe
Shallow colluvial deposits (relatively coarse texture)	BB1-6; BC1-6; BF1-6; BH1-6; BK1-6; BN1-6; BO1-6; BP1-6; BS1-6; RB1-6; RC1-6; RD1-6; RF1-6; RG1-6; RH1-6; RP1-6; RS1-6; RT1-6; RY1-6	4 Sk Ts	severe	severe	moderate
	RA1-3,5,6,9,10; RJ1-3,5,6	5 Sk Ts	severe	severe	severe
Talus, scree	YK1,9-11; YR1,9	5 Sb Ts	severe	severe	severe
Deep glacial till (relatively fine texture)	CO1-4; MK1-4; ML1-4; MO1-4; MR1-4	3 Sf Tu	moderate to severe	moderate to severe	moderate to severe
Deep glacial till (medium texture)	CD1-4; FL1-4; K1-4; MC1-4; ME1-4; MG1-4; MM1-4; MP1-4; MS1-4; MT1-4; MW1-4; MX1-4; MZ1-4; P1-4; SN1-4; SS1-4; SY1-4	3 Sf Tu	moderate	moderate	moderate
	MD1-4; SP1-4; WY1-4	2 Tu	moderate	moderate	moderate

Table 5.3 (Continued) Soil Interpretations for Recreation*

Soil Parent Material Groups	Soil Association Components	Physical Carrying Capacity for Outdoor Recreation	Soil Limitations For		
			Campsite and Picnic Area	Playgrounds	Paths and Trails
Deep glacial till (relatively coarse texture)	MF1-4; MN1-4; MU1-4; SL1-4	2 Tu	slight	moderate	slight
Shallow glacial till	All #5 soil association components of till derived soils, eg. CD5, FL5	3 or 4 Sk Tu	moderate	moderate to severe	slight to moderate
Avalanche tracks and run-out zones (all deposits)	All #8 soil association components, eg. BB8, CAI8......	5 (occ.4) Ls Ts	severe	severe	severe
Eroded or failing deposits (Regosolic soils)	All #7 soil association components, eg. CD7, RE7.......	5 (occ.4) Lg Lf Ts	severe	severe	severe
Saline/Alkaline deposits	M10; P11	3 Sf Tu	moderate	severe	moderate
	SA11	2 Sc	moderate	moderate	moderate

* Phyical Carrying Capacity for Recreation classes and subclasses are described in Block and Hignett, 1977. Limitation interpretations and methodology are described in Montgomery and Edminister, 1966.

Table 5.4 Ungulate Biophysical Capability of the Soil Associations*

Soil Association	Ungulate Biophysical Capability for						
	Elk (E)*	Mule Deer (M)	Whitetail Deer (W)	Moose (X)	Mountain Sheep (S)	Mountain Goat (G)	Caribou (C)
AS (Avis)	E^3 E_4	M_4	W_4	X^3 X^2			
AZ (Abruzzi)	E_3 E^3 E^4 E_4	M_3 M_4	W_3 W_4 W_5	X_4 X^3			
BB (Brenman)	E_4 E_5 E_3 E^3	M_4		X_5	S_5		
BC (Beatrice)	E_4 E_5	M_4 M_5		X_5			
BF (Big Fish)	E^4 E_4	M_4 M_3	W_5		S_5		
BH (Buhl Creek)	E_4	M_4		X_5			
BK (Bohan Creek)	E_4	M_4		X_5			C_5
BN (Burtontown)	E_4	M_4	W_5	X_4 X_5			
BO (Bonner)	E_4	M_4		X_4 X_5			C_4
BP (Bunyon)	E_4 E_5	M_4 M_5		X_5		G_5	
BS (Badshot)	E_4 E_5	M_4 M_5			S_5 S_4	G_5 G_4	
CA (Cadorna)	E_3	M_3 M_4	W_5	X^3 X_4			
CAI (Caithness)	E^3 E^2	M^1 M^2	W^3 W_4 W_5		S^3		
CB (Coubrey)	E_4 E_3	M_4	W_4 W_5	X_5			
CC (Coal Creek)	E_3 E_4	M_4	W_4	X_4			
CD (Cedrus)	E^3 E_4	M_4 M^4 M^2	W_4 W_5 W_3	X_4 X^4 X_5			
CE (Cayuse)	E_4	M_4	W_4 W_5	X_5			
CF (Clifty)	E_4	M_4	W_4	X_4			
CG (Cummings)	E^1 E^2	M^2 M_4	W_4		S^2		
CH (Champion)	E_4	M_4	W_5	X_4			

Table 5.4 (Continued) Ungulate Biophysical Capability of the Soil Associations*

Soil Association	Ungulate Biophysical Capability for						
	Elk (E)*	Mule Deer (M)	Whitetail Deer (W)	Moose (X)	Mountain Sheep (S)	Mountain Goat (G)	Caribou (C)
CI (Conrad)	E_4	M_4 M_5		X_5		G_5	
CJ (Calderol)	E_4	M_4	W_5	X_5	S_4	G_4 G_5	
CK (Cochrae)	E^3 E^4 E_4	M_4 M^4	W_4 W_3 W_5	X_5 X_4			
CL (Calamity)	E_4	M_4	W_5 W_4	X_4 X_5			C_4
CLD (Cold Creek)	E_4	M_4 M_5	W_5 W_4	X_5 X_4			
CM (Columbine)	E_4 E_3 E_5	M_4 M_5		X_5	S_4 S_5	G_5 G_4	
CN (Crowsnest)	E^3 E^2 E_3 E_4	M_4 M_3	W_3 W_4	X_4 X^2			
CO (Cokato)	E_4 E^2	M_4 M^3	W_4 W_5	X_4 X_5 X^3			
COL (Colin Creek)	E^3 E_4	M^2 M^3 M_4	W_4 W_5	X_5	S_4 S_5 S^1	G_4	
COR (Cornwell)	E_4 E^3	M_4 M^3	W_4 W_5	X_5 X_4 X^3	S_4		
COY (Coyote Creek)	E_3 E_4 E_5	M_4 M_5			S_3 S_5	G_3 G_4	
CP (Cooper)	E_4	M_4	W_5 W_4	X_4 X_5			C_4
CQ (Corrigan)	E_4 E_3	M_4		X_5 X_4	S^4 S^5	G_5	
CR (Cervil)	E^2 E^3 E_4 E_5	M^2 M_4 M_5	W_4 W_5 W^2		S^5 S^4 S^2	G_5	
CS (Crossing)	E_4	M_4	W_5	X_5 X_4	S_5	G_5	
CT (Courcelette)	E_4 E_3 E^3	M_4 M^4 M_3	W_5 W_4	X_5 X_4	S_4 S^4	G_5	
CW (Couldron)	E_4	M_4 M_5	W_5	X_4 X_5	S_5	G_5	
CX (Corbin)	E_4 E_3	M_4 M_3	W_4 W_5	X_5 X_4			
CY (Couldrey)	E_4	M_4		X_5	S_5	G_5 G_4	
CZ (Connor)	E_4 E_5 E_3	M_4 M_5	W_5 W_4	X_5 X_4			

Table 5.4 (Continued) Ungulate Biophysical Capability of the Soil Associations*

Soil Association	Ungulate Biophysical Capability for						
	Elk (E)*	Mule Deer (M)	Whitetail Deer (W)	Moose (X)	Mountain Sheep (S)	Mountain Goat (G)	Caribou (C)
E (Elko)	E^2 E^1 E^3	M^3 M^2 M_4	W^2 W^3 W^1 W_3	X^3 X_4			
F (Flagstone)	E^1	M^1 M^3 M_4	W^2 W^3				
FA (Follock)	E^2 E^3 E^4	M_4 M^3	W_4 W_3 W_5	X^2 X^3 X^4			
FD (Fadeway)	E_3 E_4 E^4	M_4 M_3	W_4 W_5	X^4 X_4 X_5			
FE (Ferster)	E^3 E_4 E_3	M_4	W_5 W^3 W_3	X^3 X^2 X_4			
FF (Firewood)	E^3 E^2 E^1 E_4 E_3	M_4 M_5 M^2	W_5 W_4 W^2	X_4 X^3 X_5			
FJ (Fire Mountain)	E_4 E_3 E^4	M_4 M_3	W_5	X^4 X_5			
FK (Font Creek)	E_4 E^4	M_4	W_5	X^4 X_5 X^3			
FL (Flatbow)	E^3 E_4 E^2 E^1	M_4 M^3 M^2	W_5 W_4 W^2 W^3 W_3	X_5 X_4			
FM (Frayn Mountain)	E^3 E^2	M_4	W_4 W_3 W_5	X^3 X^2			
FO (Frontal)	E^3 E^4 E^2 E_3	M_4	W_5 W_4	X^3 X^4 X_4			
FP (Fenwick)	E_4 E_3 E^4	M_4 M_3	W_5 W_4	X_5 X_4 X^4			
FQ (Forum Mountain)	E_4 E^4	M_4	W_4	X^4			
FR (Fletcher)	E_4 E^3	M_4	W_5 W^4	X_4 X^3			
FS (Fort Steele)	E^2 E^1 E^3	M_5	W^1 W_3 W^3	X_5 X_4 X^3			
FT (Fruitvale)	E_4	M_4 M^3	W_4 W_5	X^3 X_4			
FU (Four Points)	E^3 E_4	M_4 M_3	W_4 W_3 W_5	X^3 X_4			
FV (Festubert)	E_4 E^3	M_4	W_5 W_4	X_5 X_4 X^3			
FX (Fishertown)	E^2 E^1 E^3	M_4 M_5 M_3	W^3 W^2 W^1 W_3				

Table 5.4 (Continued) Ungulate Biophysical Capability of the Soil Associations*

Soil Association	Ungulate Biophysical Capability for						
	Elk (E)*	Mule Deer (M)	Whitetail Deer (W)	Moose (X)	Mountain Sheep (S)	Mountain Goat (G)	Caribou (C)
FZ (Fox Lake)	E^3 E_4 E^2	M_4 M^3	W_4 W_5 W_3	X^3 X_4 X^2			
GB (Gagnebin)	E^3 E_4 E_3	M_4	W_5 W_4	X_4 X^3 X^4			
GC (Gydosic)	E_4 E^3	M_4	W_5 W_4	X_4 X^3			
GD (Goodum)	E^3 E^4 E^2	M_4 M^3	W_4 W_3 W_5	X^3 X^2 X_4			
GE (George)	E_4 E_3	M_4 M_3	W_5 W_4	X_5 X_4 X^4			
GL (Gold Creek)	E_4 E^4 E_3	M_4	W_5	X^3 X_5 X^4			
GN (Glencairn)	E_4 E^3 E_3	M_3 M_4 M^3 M^2	W_4 W_5	X^3 X^2 X_3 X_4			
GR (Grundle)	E^3 E^2	M^2 M_4	W_4 W_5	X^3			
GT (Galton)	E^2 E^3 E_4	M_4 M^3 M^4	W_4 W_3 W_5	X^2 X^3 X_5			
GY (Glenlily)	E_4 E_3	M_4 M_3	W_4 W_3	X^3 X^4 X_4			
GZ (Grizzly)	E_4	M^4	W_4 W_5	X_4 X^3			
H (Hyak)	E^2 E_3	M_4 M_5 M^1	W_3 W^3				
K (Kinbasket)	E^1 E^3 E^2	M^3 M^2 M_3	W^3 W_4 W^2	X_5 X_4			
KA (Kaslo)	E_4 E^3	M_4 M^3	W_4 W_5	X_4			
KE (Keeney)	E^2 E^3 E_4	M_4 M^3 M^2	W_4 W^2	X_4 X_5			
KG (Kingcome)	E_4	M_4	W_5	X_5			
KO (Kokum)	E_3 E^1 E^3 E^2	M_5 M^1	W_3 W^1 W^3	X_5 X^4 X^3			
KR (Kinert)	E_4 E^3	M_4 M^3	W_5 W_4	X_4			
KY (Kayook)	E^1 E^2 E^3	M^1 M^3 M_4	W^1 W^3				
L (Lakit)	E_3 E^1 E^3 E^2	M_5 M^1 M_4	W^3 W^1 W^3	X_5 X^4 X^3			

Table 5.4 (Continued) **Ungulate Biophysical Capability of the Soil Associations***

Soil Association	Ungulate Biophysical Capability for						
	Elk (E)*	Mule Deer (M)	Whitetail Deer (W)	Moose (X)	Mountain Sheep (S)	Mountain Goat (G)	Caribou (C)
LL (Linten)	E_4 E^3	M_4	W_5	X_4 X_3			
LN (Lancaster)	E^3 E^2 E^1	M_4 M^3	W_4 W_5	X^3 X_4			
LY (Lawley)	E_4 E_3 E^4	M_4	W_5 W_4	X_4 X^3			
M (Mayook)	E^3 E^1 E^2	M^3 M^1 M^2	W^2 W^1 W^3				
MA (Madias)	E^3 E^2 E_4	M_4 M^4 M_5	W_3 W_4	X_4 X^4 X^3			
MC (Marconi)	E_4 E_5	M_4 M_5		X_5	S_5 S_4	G_5	
MD (Marmalade)	E^3 E^2 E_3	M^3 M^2 M_4	W^3 W_4 W_5	X_4 X^3			
ME (Melbert)	E_4 E_5	M_4 M_5	W_5	X_5 X_4			
MF (Mansfield)	E_3 E^3	M_3	W_4	X_4			
MG (McQuaigly)	E_4 E_5	M_4 M_5		X_5 X_4	S_5	G_4	
MK (Matkin)	E_4	M_4	W_4 W_5	X_5 X_4			
ML (McCorn)	E_4 E_3	M_4	W_5	X_5 X_4	S_5 S_4	G_4	
MM (Mount Mike)	E_4	M_4	W_5	X_5 X_4	S_5	G_5	
MN (Minitown)	E_4 E_3	M_4	W_5	X_5 X_4			
MO (Morrissette)	E_4 E^3 E^4 E^2	M_4 M^3	W_5 W_4	X_5 X_4 X^4 X^3			
MP (Morro Mountain)					S_4	G_4	
MR (Maguire)	E_4	M_4	W_5	X_5 X_4	S_4	G_5	
MS (Malpass)	E^4 E^3	M_4 M^3	W_5 W_4 W_3	X_4 X_5			
MT (McLatchie)	E^3 E^2 E_4 E^4	M_4	W_5 W_4 W^4	X_5 X^3 X_4			
MU (Maiyuk)	E_4 E^3	M_4	W_5	X_5 X_4	S_5 S_4		

Table 5.4 (Continued) Ungulate Biophysical Capability of the Soil Associations*

Soil Association	Ungulate Biophysical Capability for						
	Elk (E)*	Mule Deer (M)	Whitetail Deer (W)	Moose (X)	Mountain Sheep (S)	Mountain Goat (G)	Caribou (C)
MW (Moscliffe)	E_4 E^3 E^4	M_4 M^4 M_3	W_5	X_5			
MX (McKay Mountain)	E_4	M_4		X_5	S_5	G_5 G_4	
MY (Michel)	E^3 E^1 E_4	M_4	W_4 W_3	X_4 X^3			
MZ (Murdock)	E^3 E^1 E_4	M_4 M^2	W_4 W^3 W_5	X_4 X_5 X^3			
NW (Nowitka)	E^2 E^3 E^1	M_5 M_4	W^1 W^3 W_3	X^3 X_4 X_5			
OD (Odlumby)	E_4 E^3	M_4	W_5 W_4	X^3			
OL (Olivia)	E^3 E^2	M^3	W^3	X^3			
ON (O'Neill)	E^3 E^4 E_4	M_4	W_4 W_5	X^3 X^4			
OS (Olsonite)	E^2 E_3	M_4 M_3	W_5 W^2 W_3	X^3			
P (Plumbob)	E^2 E^1	M^3 M_4	W^3 W^2 W^4 W_3				
RA (Radium)	E_5 E_3 E_4	M_5 M_4			S_5 S_4 S^3	G_3 G_4 G^3	
RB (Rockbluff)	E^1 E^2 E^3	M^2 M^3 M^4	W_3 W^2 W_4		S^1 S^2 S^3		
RC (Robert Creek)	E_4	M_4	W_5	X_5	S_4		
RD (Ridge Range)	E_4 E_5	M_4 M_5	W_5	X_5		G_4	
RE (Rock Cleft)	E_4 E^3	M_4 M^3	W_5 W_4	X_5 X_4	S^3		
RF (Rourke)	E_4	M_4 M_5		X_4		G_4 G_5 G_3	
RG (Rainbowl)	E_4 E_5	M_4 M_5			S_5 S_4	G_5 G_4	
RH (Roche Mountain)	E_4 E_5	M_4 M_5			S_4	G_4	
RI (River Run)	E_4 E^3 E^4	M_4 M^4	W_5 W_4	X_5 X_4 X^4			
RJ (Rock Lake)					S_4	G_4	

Table 5.4 (Continued) Ungulate Biophysical Capability of the Soil Associations*

Soil Association	Ungulate Biophysical Capability for						
	Elk (E)*	Mule Deer (M)	Whitetail Deer (W)	Moose (X)	Mountain Sheep (S)	Mountain Goat (G)	Caribou (C)
RK (Rocky Ridge)	E_4 E_5 E_3	M_4 M_5		X_5		G_4 G_3	
RN (Roth Creek)	E_4	M_4		X_5 X_4		G_5	
RP (Round Prairie)	E_4 E^1	M_4 M^1	W_5 W^3		S^1		
RR (Racehorse)	E_4 E_3 E^4	M_4 M_3	W_5	X_5 X_4 X^4			
RS (Rosen Lake)	E^3 E_4	M^2 M^3 M^1	W_5 W_4		S_3 S_5		
RT (Ruault)	E_4 E_5	M_4 M_5			S_4 S_5	G_4 G_5	
RU (Russette)	E_4 E_5 E^3	M_4 M_5 M^4	W^5	X_5 X_4		G_5	
RY (Ryanier)	E_4 E_5 E^3	M_4	W_4 W_5	X_4 X_5			
S (Salishan)	E^2 E_3 E^1	M_5 M_4	W^1 W^3 W_3	X^3 X_4 X_5			
SA (Saha)	E^2 E^1 E^3	M_4 M^4	W^2 W^3 W^1 W_4				
SL (Sentinel)	E_4 E_5	M_4 M_5	W_4	X_4 X_5			C_4
SN (Sandon)	E_4	M_4	W_4	X_4 X_5			C_4 C_5
SP (Spillimacheen)	E_4 E_3 E_5	M_4	W_4 W_5	X_4 X_5	S_5	G_5	
SS (Shields)	E_4 E_5	M_4	W_4	X_4 X_5			C_4
SY (Skelly)	E_4	M_4	W_4 W_5	X_4 X_5			C_5
WY (Wycliffe)	E^1 E^3 E^2	M_4 M^3 M^2	W^3 W^2 W_3 W_4				
YK (Yahk Creek)	E_5	M_5			S_4 S_5	G_4	
YR (Ymir)	E_5	M_5				G_5	

* Capability classes were derived by overlaying ungulate biophysical capability and soil maps. Capability classes for winter range are superscripts to the ungulate species symbol, while summer range classes are subscripts.

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GLOSSARY

Aggregate - The mineral material such as sand, gravel, shells, slag, or broken stone, or combinations thereof, with which cement, or bituminous material is mixed to from a mortar or concrete.

Alkaline Soil - Any soil that has a pH greater than 7.0.

Anthropogenic - Man made, or man modified materials, including those associated with mineral exploitation and waste disposal.

Apron - A relatively gentle slope at the foot of a steeper slope, and formed by materials derived from the steeper upper slope.

Aspect - A measure of the orientation of a slope (in relation to north) by means of compass points.

Atterberg Limits (Plastic Limits) - The range of water content over which a soil exhibits plastic behavior. The value for the Lower Atterberg Limit is the water content at which the soil is not plastic when worked and crumbles on application of pressure. The Upper Atterberg Limit is the water content at which the soil changes from plastic and begins to flow.

Available Water Storage Capacity - The portion of water in a soil that can be readily absorbed by plant roots; generally considered to be that water held in the soil against a pressure of up to approximately 15 atmosphere.

Avalanche - A large mass of snow or ice, sometimes accompanied by other material, moving rapidly down a mountain slope.

Basal Till - See Moraine.

Base Saturation - The extent to which the absorption complex of a soil is saturated with exchangeable cations other than hydrogen and aluminum.

Bearing Capacity - The average load, per unit area, that is required to rupture a supporting soil mass.

Bedrock - Outcrop, and rock covered by a thin layer (<10 cm thick) of unconsolidated materials.

Biophysical Soil Association - See Soil Association.

Blanket - A mantle of unconsolidated materials thick enough to mask minor irregularities in the underlying material (usually bedrock), but which still conforms to be general underlying topography.

Bog - An area covered, or filled with, peat material which generally consists of undecomposed to moderately decomposed sphagunum mosses.

Bulk Density - The weight of ovendry soil (105° C) divided by its' volume at field moisture conditions, expressed in grams per cubic centimeter.

Calcareous Phase, Calcareous Soil - Soil containing sufficient calcium carbonate (often with magnesium carbonate) to effervesce visibly in all horizons when treated with 0.1 N hydrochloric acid.

Capability Class - A rating that indicates the suitability of the land for a specified use(s). It is commonly a grouping of subclasses that have the same relative degree of limitation, or hazard. The limitation or hazard becomes progressively greater from Class 1 upwards.

Carbonate - Compounds containing the radical CO_3 (i.e. calcium carbonate, magnesium carbonate).

Carbon-Nitrogen Ratio (C/N Ration) - The ratio of the weight of organic carbon to the weight of total nitrogen in a soil or in an organic material.

Cation Exchange Capacity - A measure of the total amount of exchangeable cations that can be held by a soil. Expressed in milliequivalents per 100 g of soil.

Channelled - Surfaces crossed by a series of channels.

Clay - As a soil separate, the mineral soil particles less than 0.002 mm in diameter and usually consisting largely of clay minerals. As a soil textural class, soil materials that contain 40 or more percent clay, less than 45 percent sand and less than 40 percent silt.

Climatic Moisture Deficit - The negative difference between precipitation and potential evapotranspiration from May 1st to September 30th.

Climatic Moisture Surplus -The positive difference between precipitation and potential evapotranspiration from May 1st to September 30th.

Coarse Fragments - Rock or mineral particles larger than 2mm in diameter.

Colluvium - Product of mass wasting; materials that have reached their present position by direct, gravity induced movement.

Consistence - The mutual attraction of the particles in a soil mass, or their resistance to separation or deformation.

Creep (Soil Creep) - An imperceptibly slow, more or less downward and outward movement of soil or rock on slopes. The movement is essentially viscous, under shear stresses sufficient to produce permanent deformation but too small to produce shear failure, as in a landslide.

Debris Avalanche - Very rapid downslope movement of saturated surficial materials, weathered rock and plant debris.

Debris Slide - Rapid downslope movement of weathered and/or incoherent regolith, where movement is by sliding or rolling.

Eluvial Horizon - A soil horizon from which material has been removed in solution or in water suspension.

Eolian - Materials transported and deposited by wind action.

Erosion - The group of processes whereby surficial or rock materials are loosened or dissolved, and removed from any part of the earth's surface. It includes the processes of weathering, solution, corrosion and transportation.

Edaphic - 1) Pertaining to the soil. 2) Resulting from, or influenced by, factors inherent in the soil or other substrate rather than by climatic factors.

Escarpment - A steep face abruptly terminating highlands.

Failing - Modification of surfaces by the formation of tension fractures, or by large consolidated or unconsolidated masses moving slowly downslope.

Fan - A fan-shaped form that can be likened to the segment of a cone, and possessing a perceptible gradient from apex to toe.

Fen - An area covered by, or filled with, peat material which generally consists of well to moderately decomposed sedge and reed species.

Floodplain - The portion of a river valley, adjacent to the river channel, which is built of sediments during the present regimen of the stream and which is covered with water when the river overflows its banks at flood stages.

Fluvial - Materials transported and deposited by streams and rivers.

Fluvioglacial - Fluvial materials transported and deposited by running water in close proximity to glacier ice.

Forest Region - An area of the landscape displaying consistent patterns of forest zones and subzones that are a reflection of regional climate.

Forest Subzone - A subdivision of a forest zone defined on the basis of climate related, successional trends of the dominant vegetation on representative sites, or on the basis of climate related differences in growth form of the dominant vegetation.

Forest Zone - An area of the landscape in which sites with similar soil and topographic conditions, have identical dominant (actual or potential) vegetation in the climax stands. Zones are usually characterized by climatic climax vegetation.

Freeze Free Period - The number of consecutive days in a calendar year free of a temperature of 0° C or less.

Friable - A consistence term pertaining to the ease of crumbling of soils.

Frost Heave - The raising of a surface, caused by ice in the underlying soil.

Genetic Materials - See Surficial Materials.

Glacial Till - See Moraine.

Glaciolacustrine - Lacustrine materials that show clear evidence of having been transported and deposited in close proximity to glacier ice.

Gleyed Soil - An imperfectly or poorly drained soil in which the material has been modified by reduction or alternating reduction and oxidation. The soil has lower chroma, or more prominent mottling, or both, in some horizons than does the associated well drained soil.

Growing Degree Days - The accumulated difference between the mean daily temperature and the standard base temperature of 5^0 C. The first/last day of any consecutive five day period when the mean daily temperature is equal to, or greater than 5^0 C is defined as the start/end of the period of accumulation.

Gullied - Surfaces in both consolidated and unconsolidated materials modified by fluvial erosion, resulting in parallel and subparallel, steep sided and narrow ravines.

Hummocky - Steep sided hillocks and hollows with multidirectional slopes dominantly between 10^0 and 35^0 (in unconsolidated materials) and steeper (in consolidated materials), and with local relief greater than 1 metre.

Iluvial Horizon - A soil horizon in which material carried from an overlying layer has been percipitated from solution or deposited from suspension. A layer of accumulation.

Inclusion - Soils or miscellaneous land types, included within a soil map delineation, but not identified in the map symbol because of the inclusions' limited areal extent.

Indurated - A soil layer that has become hardened, generally by cementation of soil particles.

Infiltration - The downward entry of water into the soil.

Karst Modified - Modification of limestone and other rocks by the process of solution, and of overlying, unconsolidated materials by collapse resulting from that solution.

Krummholz - High elevation areas in which, due to severe and fluctuating climatic conditions, tree species occur in stunted and layered forms as scattered individuals, in clumps, or in discontinuous coverage with non-treed areas.

Lacustrine - Sediments that have settled from suspension in bodies of standing fresh water, or that have accumulated at their margins through wave action.

Landform - The various shapes of the land surface resulting from a variety of actions such as deposition or sedimentation (eskers, lacustrine basins), erosion (gullying, canyons) and earth crustal movements (mountains).

Leaching - The removal from the soil of materials in solution.

Level - A flat, or very gently sloping (<5°) undirectional surface with a generally uniform slope and local relief of less than 1 m.

Liquid Limit (Upper Plastic Limit) - 1) The water content corresponding to an arbitrary limit between the liquid and plastic states of a soils' consistence. 2) The water content at which a pat of soil cut by a groove of standard dimensions, will flow together for a distance of 12 mm under the impact of 25 blows in a standard liquid limit apparatus.

Loess - Largely homogeneous, unstratified silt and fine sand of eolian origin.

Mass Movement - Movement of a portion of the land surface as in creep, landslide, or slip.

Milliequivalent - One thousandth of the weight of clay or organic colloid that has a combining power equal to one gram atomic weight of hydrogen. The atomic or formula weight divided by valence/1000.

Miscellaneous Land Types - Materials depicted on soil maps that do not meet the definition of soil. Includes anthropogenic, rock and ice materials.

Modal Soil - See Most Common Soil.

Moder - Humus forms on well drained sites with diagnostic organic horizons and partial to advanced intermixing of organic matter and mineral soil: organic matter and mineral particles occur as distinct elements but not as a clay-humus complex.

Modifying Processes - Terms which describe those geological processes that have modified, or are currently modifying genetic materials and their surface expression.

Mor - Humus forms on well to imperfectly drained sites and consisting of organic horizons sharply delineated from the mineral soil.

Moraine (Till, Glacial Till, Basal Till) - The materials transported beneath, beside, on, within and in front of a glacier; deposited directly from the glacier and not modified by any intermediate agent.

Most Common Soil - The most commonly occurring soil in a given soil association.

Mottles - Spots or blotches of different colour or shades of colour interspersed within the dominant colour. They are described in order of abundance (few, common, many), size (fine, medium, coarse), and contrast (faint, distinct, prominent). Mottling in soils indicates poor aeration and lack of good drainage.

Mull - Humus forms on well to imperfectly drained sites with rapid, extensive decomposition of organic material and intimate association of colloidal organic matter with mineral soil; diagnostic organic horizons are lacking.

Nivated - Surfaces modified by frost action, erosion and mass wasting beneath and around a snowbank, so as to produce transverse, longitudinal and circular hollows.

Outwash - Sediments "washed out" by flowing water beyond a glacier and laid down in thin, foreset beds as stratified drift. Particle size may range from boulders to silt.

Parent Material (Soil Parent Material) - The unconsolidated and more or less chemically unweathered mineral, or organic, material in which the solum of a soil has developed by pedogenic processes.

Percolation (Soil Percolation) - The downward movement of water through the soil.

Permeability - The ease with which water and air pass through a bulk mass of soil or a layer of soil, based on measurements using standard techniques.

Perviousness - The potential of a soil to transmit water internally, as inferred from soil characteristics.

pH - The negative of the hydrogen-ion activity, indicating the intensity of acidity or alkalinity of a soil. See also Soil Reaction.

Phyllite - An argillaceous rock intermediate in metamorphic grade between slate and schist.

Physiographic Subdivision (Physiographic Region) - Natural regions with similar erosional and depositional processes, patterns and types of bedrocks and geologic history.

Piping - Surfaces modified by small hollows, commonly aligned along routes of subsurface drainage, and resulting from the subsurface removal of particulate matter in unconsolidated materials.

Plastic Limit - 1) The water content corresponding to an arbitrary limit between the plastic and semisolid state of consistence. 2) Water content at which a soil will just begin to crumble when rolled into a thread approximately 3 mm in diameter.

Plasticity Index - The numerical difference between the liquid limit and the plastic limit. The plasticity index gives the range of moisture contents within which a soil exhibits plastic properties.

Pyrophosphate Index - Based upon the colour of chromatographic paper dipped in organic material extracted with sodium pyrophosphate. The index is obtained by subtracting chroma from value.

Regosolic soil - Soils lacking well defined pedogenic soil horizons; usually an indication of young soils.

Rolling - Elongate or linear, parallel or subparallel hills, or ridges with slopes generally less than 15° and local relief of greater than 1 m.

Rubbed Fibre Content - Volume of dried organic material expressed as a percentage of the original material after the material has been rubbed between thumb and forefinger under flowing water until the water runs clear.

Runout Zone - The lower boundary of an avalanche path.

Saline Phase, Saline Soil - A soil characterized by 1) presence of exchangeable sodium (>15%) and other soluble salts. 2) conductivity >4mmhos/cm 25^{0}C.

Sand - Soil particles between 0.05 and 2.0 mm in diameter.

Scree - See Talus.

Sedge - Coarse, grass like plants characterized by triangular stems and usually found in wet habitats.

Seepage - 1) The escape of water downward through the soil. 2) The emergence of water from the soil along an extensive line of surface in contrast to a spring where the water emerges from a localized area.

Silt - Soil particles between 0.05 and 0.002 mm in equivalent diameter.

Site - 1) In ecology, an area described or defined by its biotic, climatic and soil conditions in relation to its capacity to produce vegetation. 2) An area sufficiently uniform in biotic, climatic, and soil conditions to produce a particular kind of vegetation.

Slope, Slope Class - See Topography.

Slump - A deep-seated, slow moving rotational failure occurring in plastic materials resulting in vertical and lateral displacement.

Soil - That part of the unconsolidated matter at the earth's surface which has been altered by climatic factors (including temperature and moisture), macro-and-micro-organisms, topography and moisture, all acting over a period of time.

Soil Association - A group of related soils that have developed on similar parent material and under similar climate conditions (expressed in this bulletin by forest subzone) but having unlike characteristics because of variations in topographic position and drainage.

Soil Association Component - Two or more soils in a soil association which consistently occur in close relation to each other. The most common soil in the component is also usually the most common soil in the association, the less common soil is usually specific for the component.

Soil Classification - The systematic arrangement of soils into categories and classes on the basis of their characteristics. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties.

Soil Colour - The colour of the soil when compared with a Munsell colour chart. The Munsell system specifies the relative degrees of the three simple variables of colour; hue, value and chroma.

Soil Development - The sequence of soil horizons characterizing a particular classification of a soil.

Soil Drainage - 1) The rapidity and extent of water removal from the soil by surface runoff and downward flow through the soil. 2) As a condition of the soil, it refers to the frequency and duration of periods when the soil is free of saturation. Soil Drainage Classes are defined in terms of very rapidly drained, rapidly drained, well drained, moderately well drained, imperfectly drained, poorly drained, and very poorly drained.

Soil Fertility - The status of a soil with relation to the amount and availability of elements necessary for plant growth.

Soil Great Group - A taxonomic group of soils in a similar pedogenic environment having certain morphological features in common.

Soil Horizon - A layer in the soil profile approximately parallel to the land surface with more or less well defined characteristics that have been produced through the operation of soil forming processes.

Soil Legend - An explanation of the symbols utilized on soil maps.

Soil Map - A map depicting the distribution of soils in an area.

Soil Map Delineation - An area delineated on a soil map that consists of one or more defined soils (or miscellaneous land types).

Soil Moisture Regime Subclasses - A classification for describing regional soil moisture conditions. Subclasses include Peraquic, Aquic, Subaquic, Perhumid, Humic, Subhumic, Semiarid, Subarid, Arid.

Soil Order - The highest category in the taxonomic classification system for characterizing Canadian soils. Soils in each of the nine orders have one or more basic soil profile characteristics in common.

Soil Phase - A subdivision of a unit of soil classification based on characteristics that affect the use and management of the soil. The phase characteristics are not a category of the classification.

Soil Profile - A vertical section of the soil through all its horizons and extending into the soil parent material.

Soil Reaction - The degree of acidity of alkalinity of a soil, usually expressed as a pH value.
Classes include:

extremely acid	pH<4.5
very strongly acid	4.6 - 5.0
strongly acid	5.1 - 5.6
medium acid	5.6 - 6.0
slightly acid	6.1 - 6.5
neutral	6.6 - 7.3

neutral	6.6 - 7.3
mildly alkaline	7.4 - 7.8
moderately alkaline	7.9 - 8.4
strongly alkaline	pH>8.5

Soil Structure - The combination or arrangement of primary soil particles into secondary aggregates which are separated from adjoining aggregates by surfaces of weakness. Aggregates differ in grade (distinctness), class (size) and type (shape). By convention, structure is described in the order or grade, class, and type.

Soil Subgroup - A subdivision of a Soil Great Group which is distinguished according to the arrangement of soil horizons within the profile.

Soil Survey - The systematic examination, description, classification and mapping of soils in an area.

Soil Temperature Regime Subclasses A classification for describing regional soil temperature conditions. Subclasses include extremely cold, very cold, cold, cool, mild.

Soil Texture - The relative proportion of sands, silt and clay in a soil, as defined by classes of soil texture. Soil textures are grouped into five classes as follows:
Coarse textured - sand, loamy sand.
Moderately coarse textured - sandy loam, fine sandy loam.
Medium textured - very fine sandy loam, loam, silt loam, sandy clay loam.
Moderately fine textured - clay loam, silty clay loam, sandy clay loam.
Fine textured - sandy clay, silty clay, clay, heavy clay.

Soil Water Holding Capacity - The ability of a soil to retain water. Usually considered to be low in sandy soils and high in clayey soils.

Solifluction - Surfaces modified by slow, gravitational, downslope movement of saturated, nonfrozen earth material behaving as a viscous mass over a surface of frozen ground.

Solum - The upper horizons of a soil in which the parent material has been modified and within which most plant roots are confined. It usually consists of the A and B horizons.

Steep - Erosional slopes generally greater than 35^0 on both consolidated and unconsolidated materials.

Stoniness - Percentage of the soil surface occupied by rock fragments greater than 15 cm in diameter.

Subdued - Linear, or nonlinear forms with slopes ranging up to 10^0 and with local relief greater than 1 m.

Surface Erosion - The wearing away of the land surface by running water, wind, ice or other geological agents.

Surface Expression - The form of genetic materials (assemblages of slopes), and pattern of forms.

Surficial Materials (Genetic Materials) - Unconsolidated materials occurring on the earth's surface and classified according to the specific processes of erosion, transportation, deposition, mass wasting and weathering that created the deposit, as well as by it's texture and surface expression.

Talus (Scree) - Sharp, angular rock fragments produced by frost action from an exposed bedrock slope.

Terrace - A relatively flat, horizontal, or gently inclined surface, sometimes long and narrow, bounded by a steep, ascending slope on one side and a steep, descending slope on the other.

Terrain Mapping - Delineating on a map the recurring patterns of surficial landforms, and describing their genetic materials, textures, modifying processes and surface expressions.

Terrain Texture - The size, roundness and sorting of particles in unconsolidated clastic sediments, and the proportional fibre content of unconsolidated organic sediments. Size classes of the various separates are as follows:

boulders	>25.6 cm
cobbles	6.4 - 25 cm
pebbles	2.0 mm - 6.4 cm
sand	0.062 mm - 2.0 mm
silt	0.0039 mm - 0.062 mm
clay	<00039 mm

Texture - See Soil Texture or Terrain Texture.

Till - See Moraine.

Topography - The shape of the land surface such as hills, mountains or plains. The slopes may be smooth or irregular. The slope classes used in this bulletin are defined as follows:

SIMPLE TOPOGRAPHY SINGLE SLOPES (REGULAR SURFACE)		COMPLEX TOPOGRAPHY MULTIPLE SLOPES (IRREGULAR SURFACE)		SLOPE %
A	depressional to level	a	nearly level	0 to 0.5
B	very gently sloping	b	gently undulating	0.5+ to 2
C	gently sloping	c	undulating	2+ to 5
D	moderately sloping	d	gently rolling	5+ to 9
E	strongly sloping	e	moderately rolling	9+ to 15
F	steeply sloping	f	strongly rolling	15+ to 30
G	very steeply sloping	g	hilly	30+ to 60
H	extremely sloping	h	very hilly	over 60

Topsoil - 1) The layer of soil moved in cultivation. 2) soil materials used to topdress roadbanks, gardens and lawns.

Unconsolidated - Geological materials that are not lithified or cemented; cohesion between particles is weak or absent and individual particles may be easily separated by hand.

Unified Soil Classification - A soil classification based upon the textural characteristics of relatively coarse textured soils, and on the plasticity and compressibility characteristics of finer soils. It is employed to predict the behavior of soil as an engineering construction material.

Vegetation Type - Plant communities having a variable number of floristic characteristics in common. Derived from a classification of vegetation plots.

Weathering - The physical and chemical disintegration, alternation and decomposition of rocks and minerals at or near the earth's surface by atmospheric agents.

APPENDIX A

ANALYTICAL METHODS

Measurements of pH were made using a combination electrode on 1:1 soil-water suspensions for mineral soils and 1:5 soil-water suspensions for organic soils (McKeague, 1976). Also determined was pH using a 1:5 soil-0.1M $CaCl_2$ solution (McKeague, 1976). Soil organic matter was determined by the wet combustion method as described by Grewelling and Peech (1960). Total nitrogen was determined according to the method described by Bremner (1960). Laverty's (1961) method, modified by John (1963), was used to determine acid soluble and available phosphorous; colour development was according to John's (1970) procedure. Exchange capacity was determined using the method described by McKeague (1976). The ammonium acetate extract was analyzed for exchangeable cations (calcium, magnesium, sodium, potassium) using a Techtron A.A.4 atomic absorption spectrophotometer. Sodium pyrophosphate soluble iron and aluminum were determined following procedures described in McKeague (1976).

Bulk densities were determined by the volumeasure method in the field with excavated samples oven-dried in the laboratory. Sieve analysis and calculation of Atterbereg Limits for determination of Unified soil textures were according to Lambe (1967), and American Society for Testing Materials Committee D18 (1964). Pipette analysis to determine percent sand, silt and clay was according to McKeague (1976). Clay minerology was determined using x-ray diffraction analysis (McKeague, 1976). Moisture status (water retention analysis) was accomplished by use of a porous plate extractor according to methodology in McKeague (1976).

Organic samples were analyzed for fibre content, sodium pyrophosphate extract and von Post scale of decomposition according to methodologies in McKeague (1976).

Detailed soil profile descriptions of soil associations sampled in the East Kootenay area, together with physical and chemical analyses, are stored in (and available from) the B.C. Soil Information System.

APPENDIX B

SOIL CORRELATION BETWEEN THE CURRENT SURVEY AND PREVIOUS SURVEYS IN, OR ADJACENT TO, THE EAST KOOTENAY AREA

Several soil surveys have been conducted, in or adjacent to, the East Kootenay project area. These were undertaken at various times in the past using the classification systems then available. Classification systems are periodically revised and upgraded resulting in changes in nomenclature and parameters measured and described. Table B.1 provides the correlation in terms of nomenclature between the current and previous surveys. The previous surveys include Soil Survey of the upper Kootenay and Elk River Valleys (Kelley and Sprout, 1956), Soil Survey of the Upper Columbia Valley (Kelley and Holland, 1961), Soil Resources of the Nelson Map Area (Jungen, 1980), and Soil Resources of the Lardeau Map Area (Wittneben, 1980). Only soils that are common between one or more of the previous surveys and the current East Kootenay survey are included in Table B.1. Not included are those that occur only in the current survey.

In "Soils of the Nelson Map Area", laboratory analysis to determine podzolic B horizons involved iron and aluminum extraction by oxalate. This method was subsequently shown to give excessively high values for soil containing volcanic ash (as is the case with many West and East Kootenay soils) and the procedure was changed to extraction with sodium pyrophosphate. Thus, in "Soils of the Lardeau Map Area" and in the current report, analysis for iron and aluminum in B horizons has been carried out using the pyrophosphate method (McKeague, 1976). As a consequence, a number of soils classified as Podzol in "Soils of the Nelson Map Area" are classified as Brunisolic in "Soils of the Lardeau Map Area" and in this report. In addition, in the East Kootenay project area, Regosolic soils developed on floodplains and colluvium, have been classified as Cumulic Regosols (based on the cumulic nature of their deposition). In "Soils of the Nelson Map Area" and "Soils of the Lardeau Map Area" these soils have been classified as Orthic Regosols.

The method of establishing soil association components has been revised since the soil legends for the Nelson and Lardeau map areas were prepared. Consequently, soils indicated in Table B.1 as occurring in either the Nelson or Lardeau areas, as well as in the East Kootenays, may not have identical soil association components defined in the soil association descriptions. Thus, it is important for persons consulting soil maps from different project area, to utilize the appropriate soil legends.

Table B.1 Soil correlation between the current survey and previous surveys in, or adjacent to, the East Kootenay Area

Biophysical Resources of the East Kootenay Area: Soils (Lacelle, 1989)			Soil Survey of The Upper Kootenay and Elk River Valleys (Kelley and Sprout, 1956); Soil Survey of the Upper Columbia Valley (Kelley and Holland, 1961)			Soil Resources of the Lardeau Map Area (Wittneben, 1980).			Soil Resources of the Nelson Map Area (Jungen, 1980)		
Soil Assoc. Symbol	Soil Association Name	Soil Classif.*	Soil Series Symbol	Soil Series Name	Soil Classification	Soil Assoc. Symbol	Soil Association Name	Soil Classif.*	Soil Assoc. Symbol	Soil Association Name	Soil Classif.*
AS	Avis	CU.R				AS	Avis	O.R	AS	Avis	O.R
AZ	Abruzzi	O.GL	A	Abruzzi	Grey Wooded						
BB	Brennan	O.DYB shli				BB	Brennan	O.DYB	BB	Brennan	O.HFP
BC	Beatrice	O.HFP shli				BC	Beatrice	O.HFP	BC	Beatrice	O.HFP
BF	Bigfish	O.EB shli				BF	Bigfish	O.EB			
BH	Buhl Creek	O.DYB shli				BH	Buhl Creek	O.DYB	BH	Buhl Creek	O.HFP
BK	Bohan Creek	O.DYB shli				BK	Bohan Creek	O.DYB	BK	Bohan Creek	O.HFP
BN	Burtontown	O.DYB shli							BN	Burtontown	O.DYB
BO	Bonner	O.HFP shli				BO	Bonner	O.HFP	BO	Bonner	O.HFP
BP	Bunyon	O.HFP shli				BP	Bunyon	O.HFP	BP	Bunyon	O.HFP
BS	Badshot	O.EB shli				BS	Badshot	O.EB			
CB	Coubrey	O.DYB				CB	Coubrey	O.DYB			
CD	Cedrus	O.EB	Cd	Cedrus	Grey Wooded						
CE	Cayuse	O.DYB							CE	Cayuse	O.DYB
CF	Clifty	O.HFP				CF	Clifty	O.HFP	CF	Clifty	O.HFP
CH	Champion	O.HFP				CH	Champion	O.HFP	CH	Champion	O.HFP
CI	Conrad	O.HFP				CN	Conrad	O.HFP			
CL	Calamity	O.DYB				CL	Calamity	O.DYB	CL	Calamity	O.HFP
CN	Crowsnest	CU.R ca	Cn	Crowsnest	Groundwater soil						
CO	Cokato	O.DYB	Co	Cokato	Brown Podzolic						
CP	Cooper	O.DYB				CP	Cooper	O.DYB	CP	Cooper	O.HFP
CR	Cervil	O.EB				CR	Cervil	O.EB			
CW	Couldron	O.EB				CW	Couldron	O.EB			

Table B.1 (continued) Soil correlation between the current survey and previous surveys in, or adjacent to, the East Kootenay Area

Biophysical Resources of the East Kootenay Area: Soils (Lacelle, 1989)			Soil Survey of The Upper Kootenay and Elk River Valleys (Kelley and Sprout, 1956); Soil Survey of the Upper Columbia Valley (Kelley and Holland, 1961)			Soil Resources of the Lardeau Map Area (Wittneben, 1980).			Soil Resources of the Nelson Map Area (Jungen, 1980)		
Soil Assoc. Symbol	Soil Association Name	Soil Classif.*	Soil Series Symbol	Soil Series Name	Soil Classification	Soil Assoc. Symbol	Soil Association Name	Soil Classif.*	Soil Assoc. Symbol	Soil Association Name	Soil Classif.*
E	Elko	O.EB	E	Elko	Brown Wooded						
F	Flagstone	O.EB	F	Flagstone	Brown Wooded						
FL	Flatbow	BR.GL	Fl	Flatbow	Podzolized Grey Wooded						
FR	Fletcher	O.DYB							FR	Fletcher	O.DYB
FT	Fruitvale	O.DYB				FT	Fruitvale	O.DYB	FT	Fruitvale	O.HFP
GR	Grundle	O.DYB	Wd	Wardrop	Brown Podzolic						
GY	Glenlily	O.DYB							GY	Glenlily	O.DYB
H	Hyak	O.DB	H	Hyak	Dark Brown						
K	Kinbasket	O.GL	K	Kinbasket	Brown Wooded	KB	Kinbasket	O.GL			
KA	Kaslo	O.DYB				KO	Kaslo	O.DYB	KO	Kaslo	O.HFP
KE	Keeney	O.EB				KE	Keeney	O.EB			
KG	Kingcome	O.HFP				KG	Kingcome	O.HFP			
KO	Kokum	O.EB	Ko	Kokum	Brown Wooded						
KR	Kinert	O.DYB							KR	Kinert	O.DYB
KY	Kayook	O.EB	Ky	Kayook	Brown Wooded						
L	Lakit	O.EB	L	Lakit	Brown Wooded						
LL	Linten	O.HFP				LI	Linten	O.HFP			
LY	Lawley	BR.GL				LY	Lawley	BR.GL	LY	Lawley	BR.GL
M	Mayook	O.EB	M	Mayook	Brown Wooded	MY	Mayook	O.EB			
MA	Madias	O.GL	Ma	Madias	Grey Wooded						
MY	Michel	O.EB	Mi	Michel	Brown Wooded						
MZ	Murdock	O.GL	Hs	Hosmer	Grey Wooded						

Table B.1 (continued) Soil correlation between the current survey and previous surveys in, or adjacent to, the East Kootenay Area

Biophysical Resources of the East Kootenay Area: Soils (Lacelle, 1989)			Soil Survey of The Upper Kootenay and Elk River Valleys (Kelley and Sprout, 1956); Soil Survey of the Upper Columbia Valley (Kelley and Holland, 1961)			Soil Resources of the Lardeau Map Area (Wittneben, 1980).			Soil Resources of the Nelson Map Area (Jungen, 1980)		
Soil Assoc. Symbol	Soil Association Name	Soil Classif.*	Soil Series Symbol	Soil Series Name	Soil Classification	Soil Assoc. Symbol	Soil Association Name	Soil Classif.*	Soil Assoc. Symbol	Soil Association Name	Soil Classif.*
NW	Nowitka	GL.CUR ca	Nt	Nowitka	Regosol	NW	Nowitka	O.R			
P	Plumbob	O.DB	P	Plumbob	Dark Brown						
RA	Radium	SM.HFP shli				RA	Radium	E.MB			
S	Salishan	GL.CUR ca	S	Salishan	Groundwater Soil						
SL	Sentinel	O.DYB				SL	Sentinel	O.DYB	SL	Sentinel	O.HFP
SN	Sandon	O.HFP				SA	Sandon	O.HFP	SA	Sandon	O.HFP
SP	Spillimacheen	O.EB				SP	Spillimacheen	O.EB			
SS	Shields	LU.HFP							SS	Shields	LU.HFP
SY	Skelly	BR.GL							SY	Skelly	BR.GL
WY	Wycliffe	O.EB	W	Wycliffe	Brown Wooded	WY	Wycliffe	O.EB			
YK	Yahk Creek	CU.R				YK	Yahk Creek	O.R	KO	Kaslo	O.HFP
YR	Ymir	CU.R				YR	Ymir	O.R	YR	Ymir	O.R

* Soil subgroup and phase symbols are defined in Table 2.1.